



(12) **United States Patent**
Lindsay et al.

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(54) **INERTIA BULLET REMOVER**
(71) Applicant: **AOB Products Company**, Columbia, MO (US)
(72) Inventors: **Michael Lindsay**, Columbia, MO (US); **Michael Cottrell**, Ashland, MO (US); **James Tayon**, Moberly, MO (US); **Timothy S. Kinney**, Warrenton, MO (US); **Mark Dalton**, Columbia, MO (US); **Brian Steere**, Columbia, MO (US); **Justin Burke**, Columbia, MO (US); **Kyle Martin**, Columbia, MO (US); **Dennis W. Cauley, Jr.**, Fayette, MO (US); **Anthony Vesich**, Columbia, MO (US); **Ryan Varnum**, Columbia, MO (US); **Seth Wheeler**, Columbia, MO (US); **Brett Eckelkamp**, Fulton, MO (US); **Matthew Kinamore**, Columbia, MO (US); **Curtis Smith**, Columbia, MO (US)

(73) Assignee: **AOB Products Company**, Columbia, MO (US)
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F42B 33/00 (2006.01)

(52) **U.S. Cl.**
CPC **F42B 33/06** (2013.01); **F42B 33/001** (2013.01)

(58) **Field of Classification Search**
CPC F42B 33/06; F42B 33/00; F42B 33/10
USPC 86/24, 43, 40, 37, 33, 28, 23
See application file for complete search history.

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Primary Examiner — John Cooper
(74) *Attorney, Agent, or Firm* — Stinson LLP

(57) **ABSTRACT**
An inertia bullet remover and associated methods for removing a bullet from an ammunition casing. The inertia bullet remover includes a carriage for carrying the ammunition casing. The carriage is movable with respect to a base between a first position and a second position. Movement of the carriage is guided by a guide. Movement of the carriage is stopped by a stop, which causes the bullet to exit the ammunition casing via inertia.

41 Claims, 24 Drawing Sheets

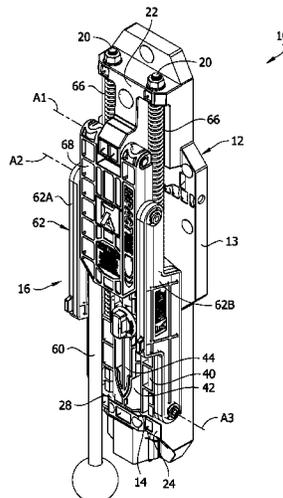


FIG. 1

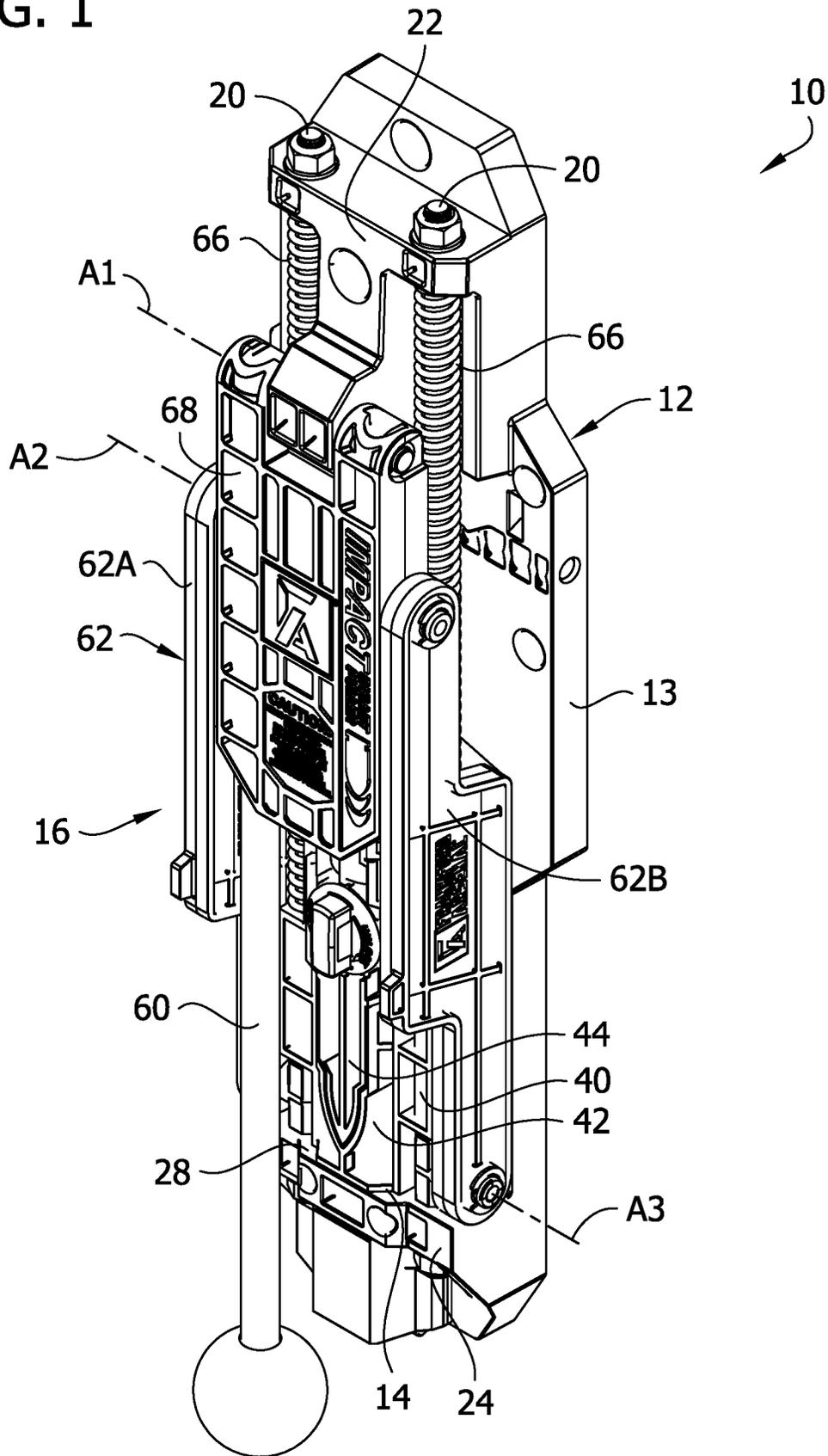


FIG. 3

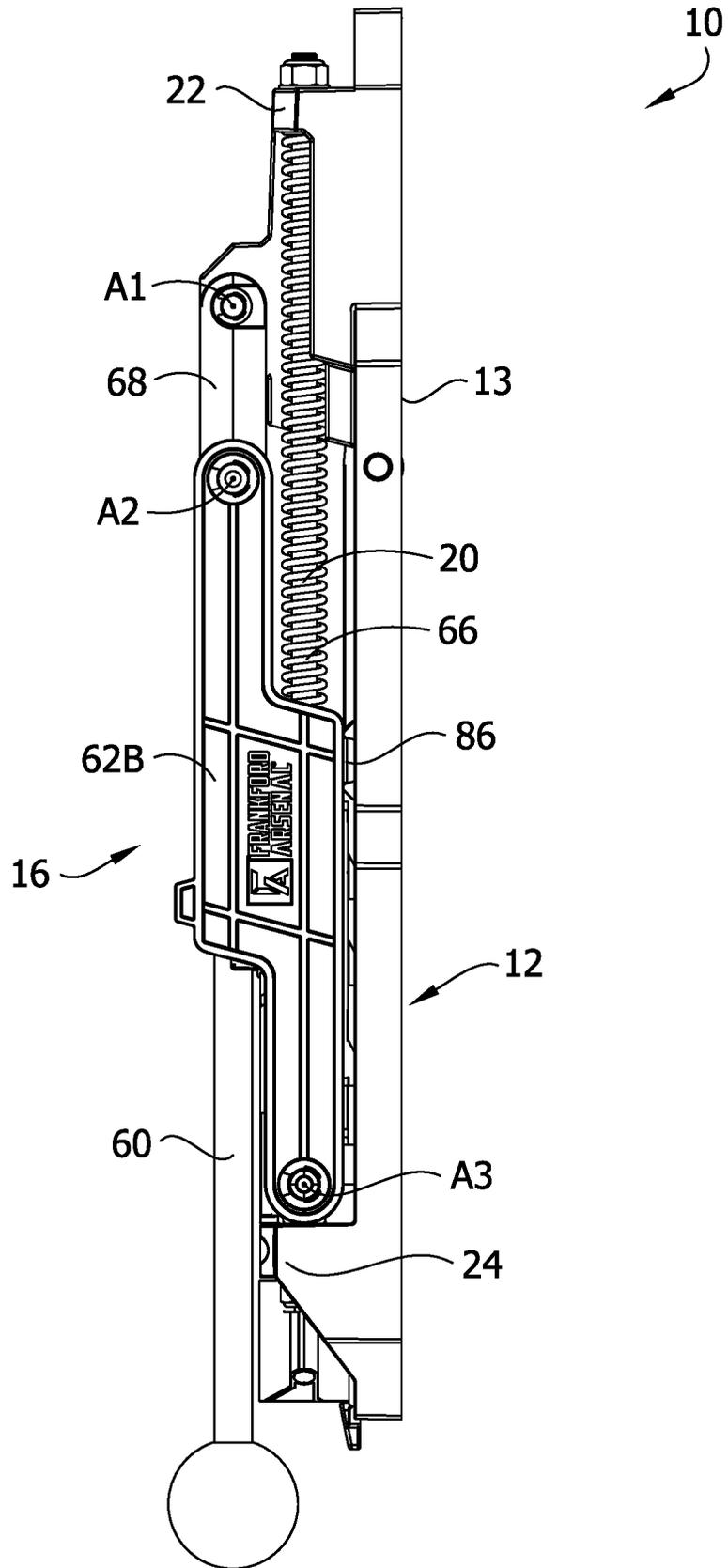


FIG. 4

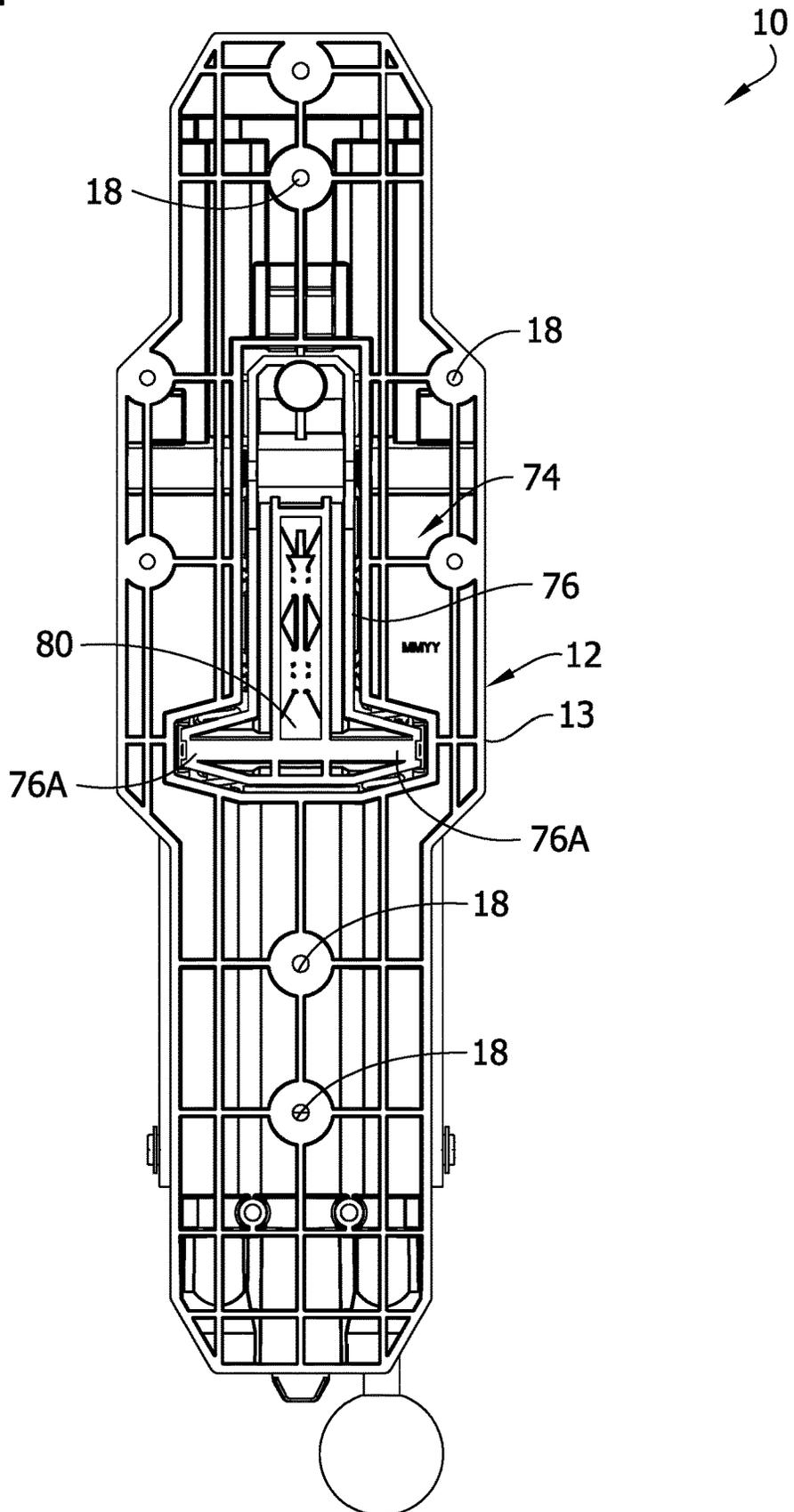


FIG. 5

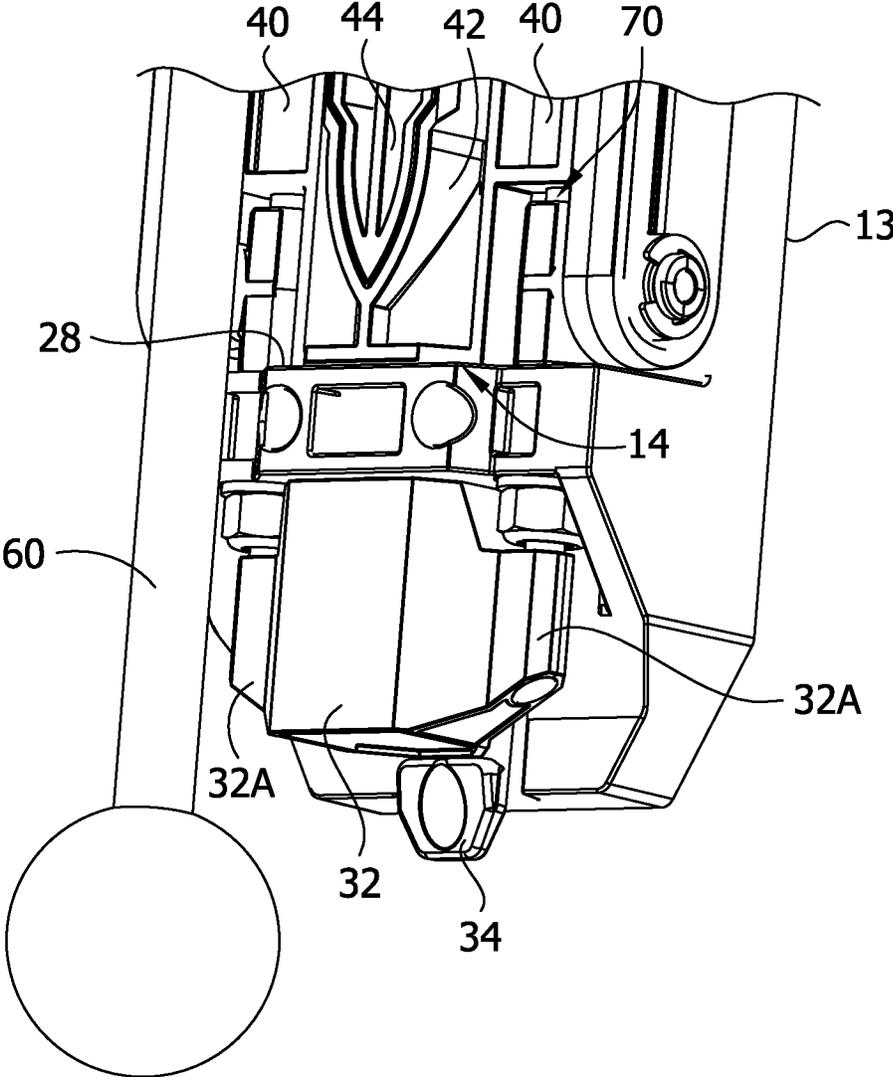


FIG. 6

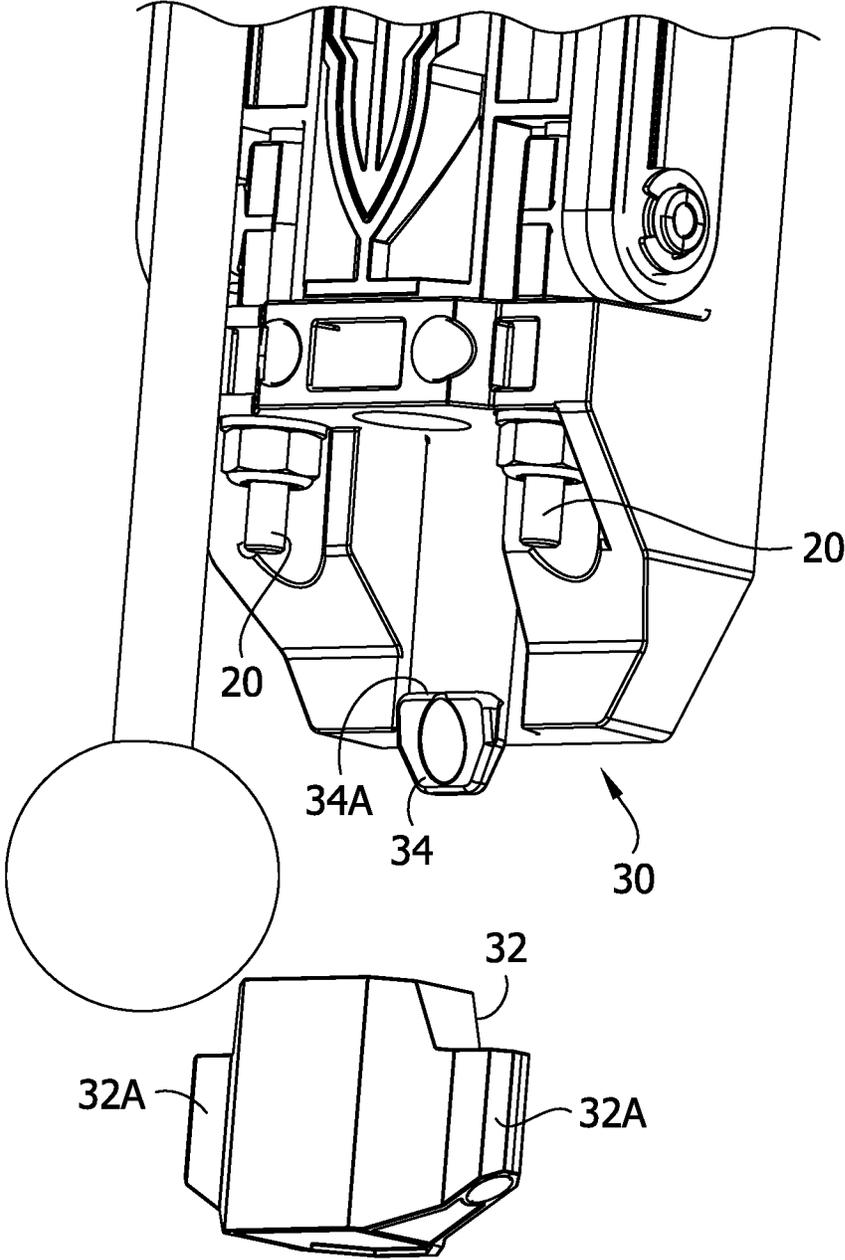


FIG. 7

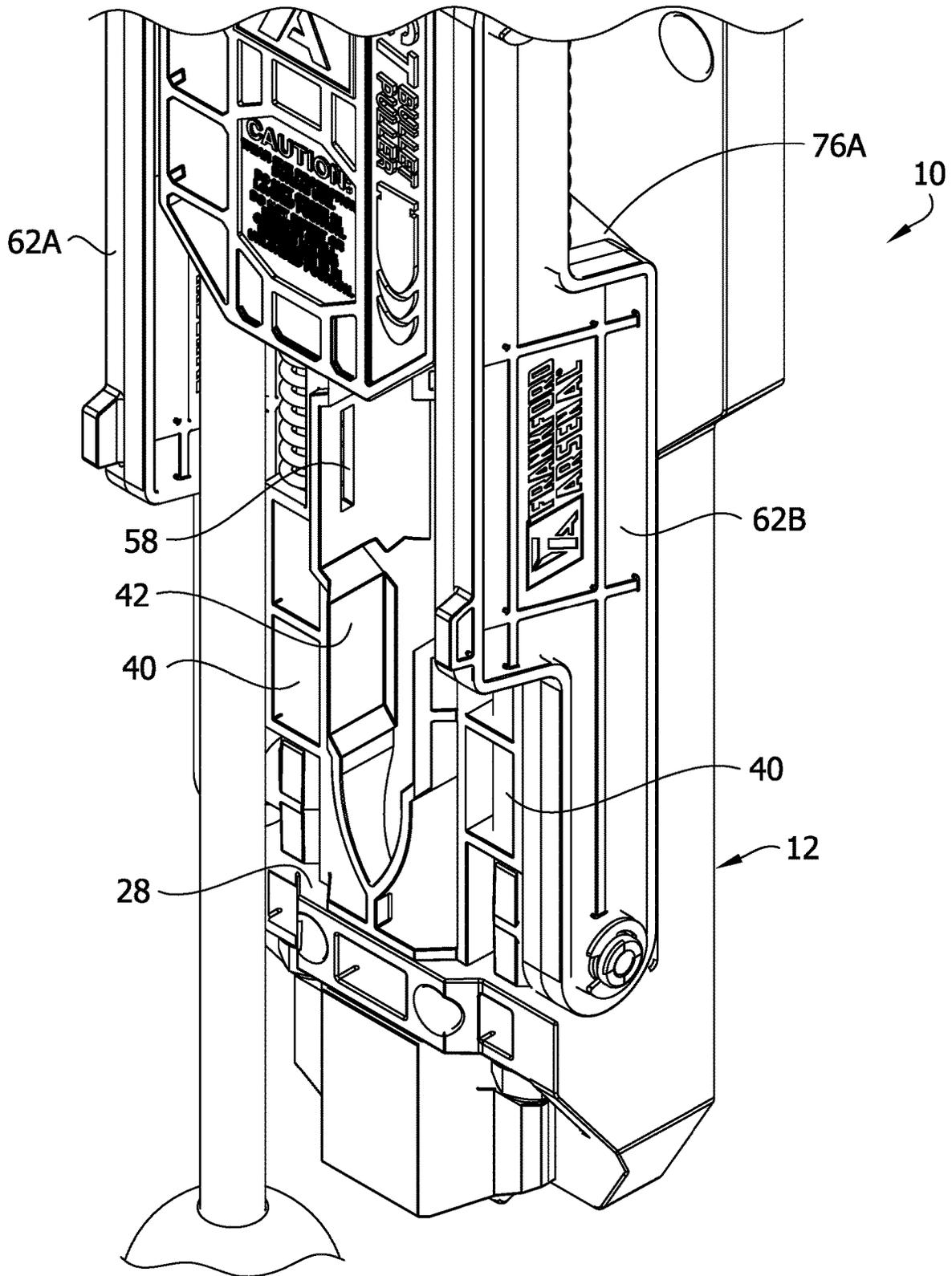


FIG. 8

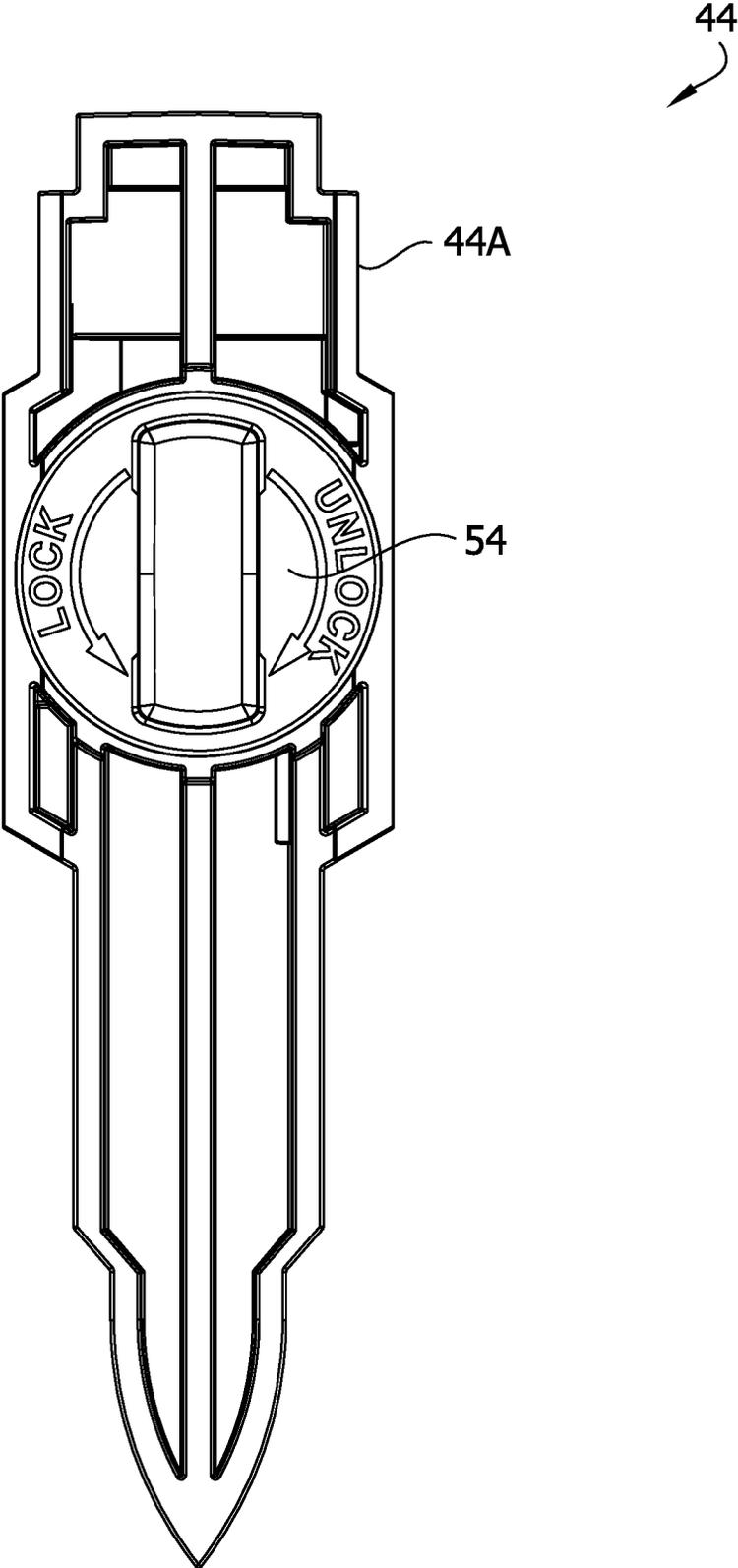


FIG. 9

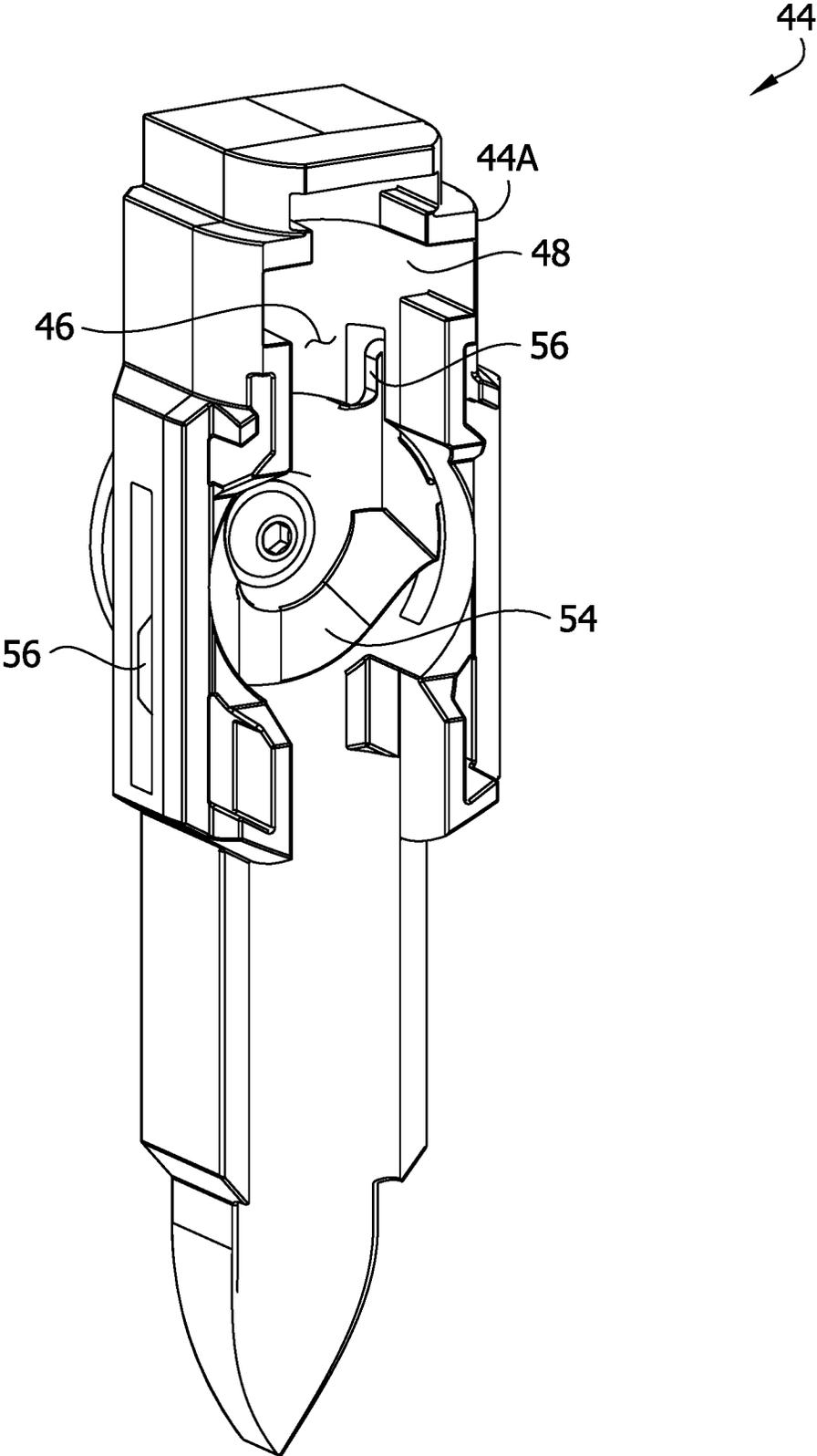


FIG. 10

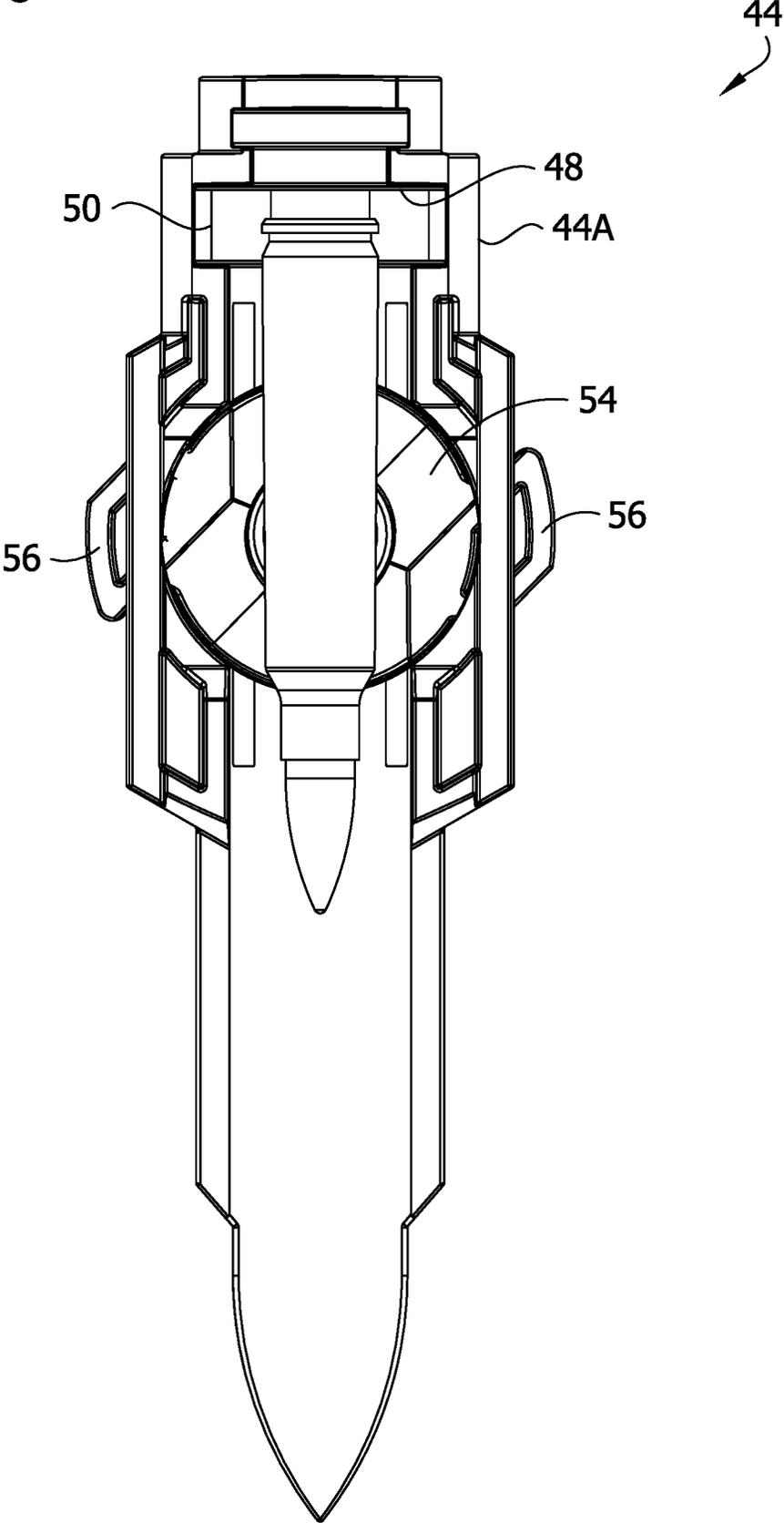


FIG. 11

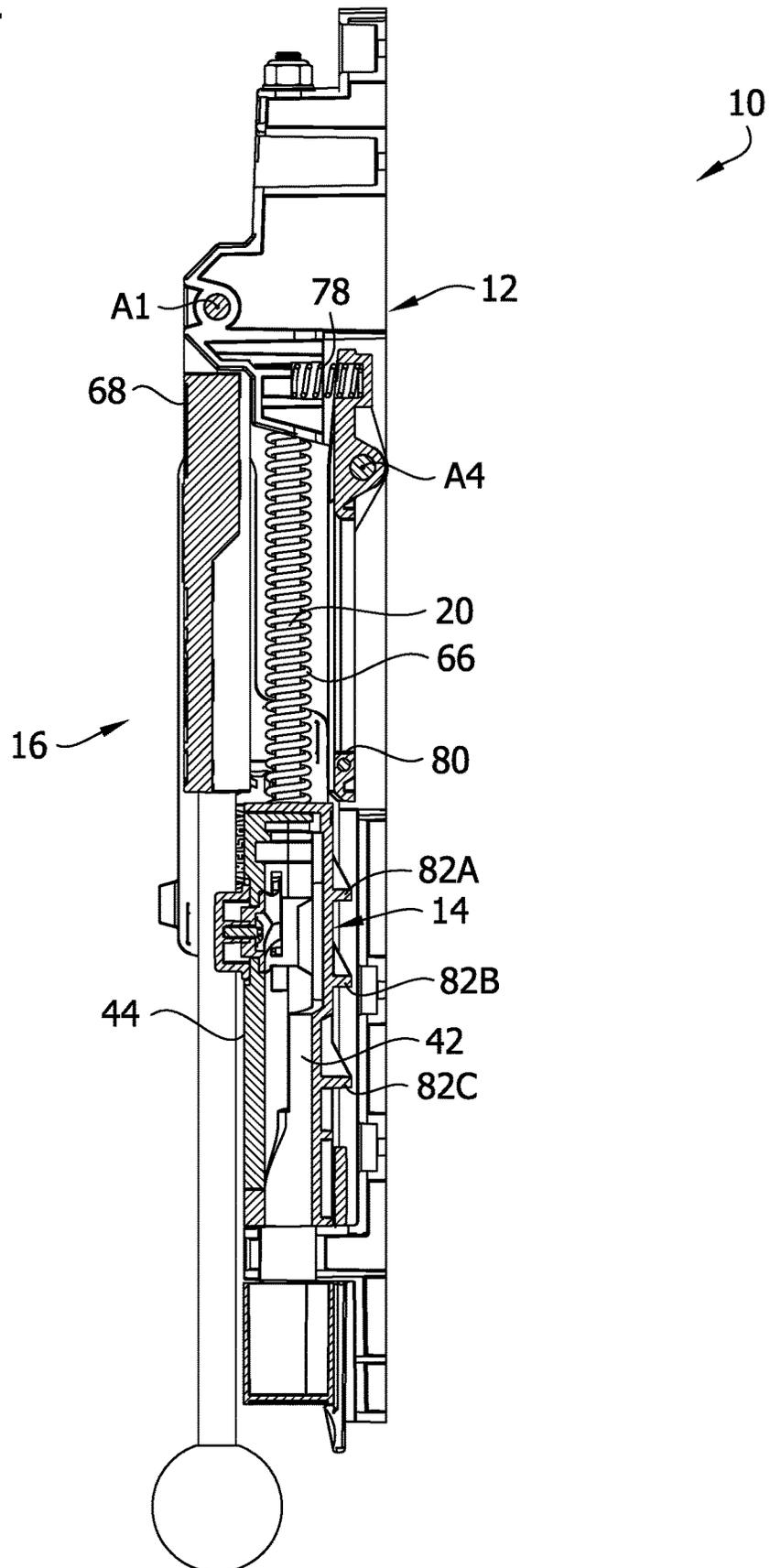


FIG. 12

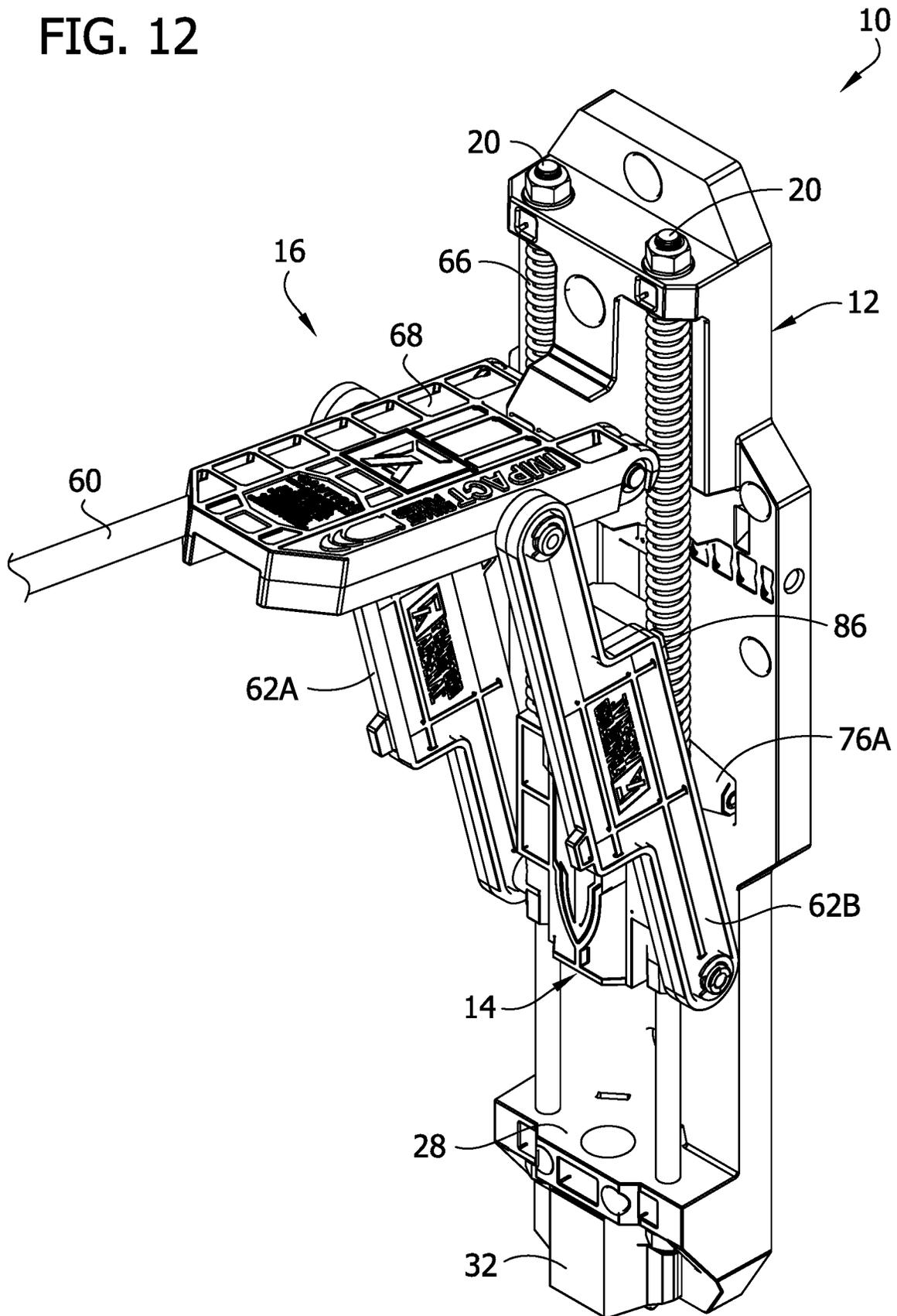


FIG. 13

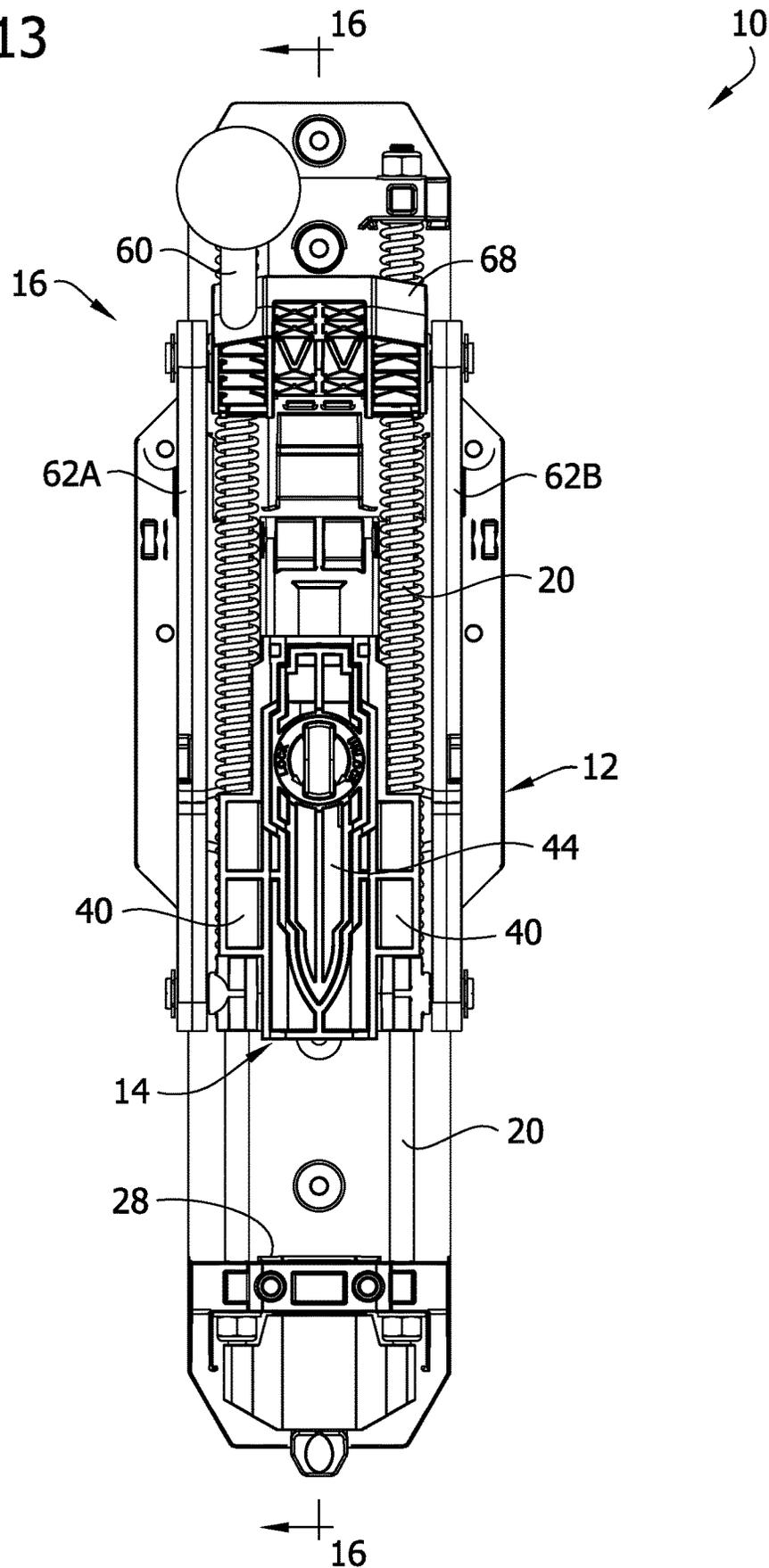


FIG. 14

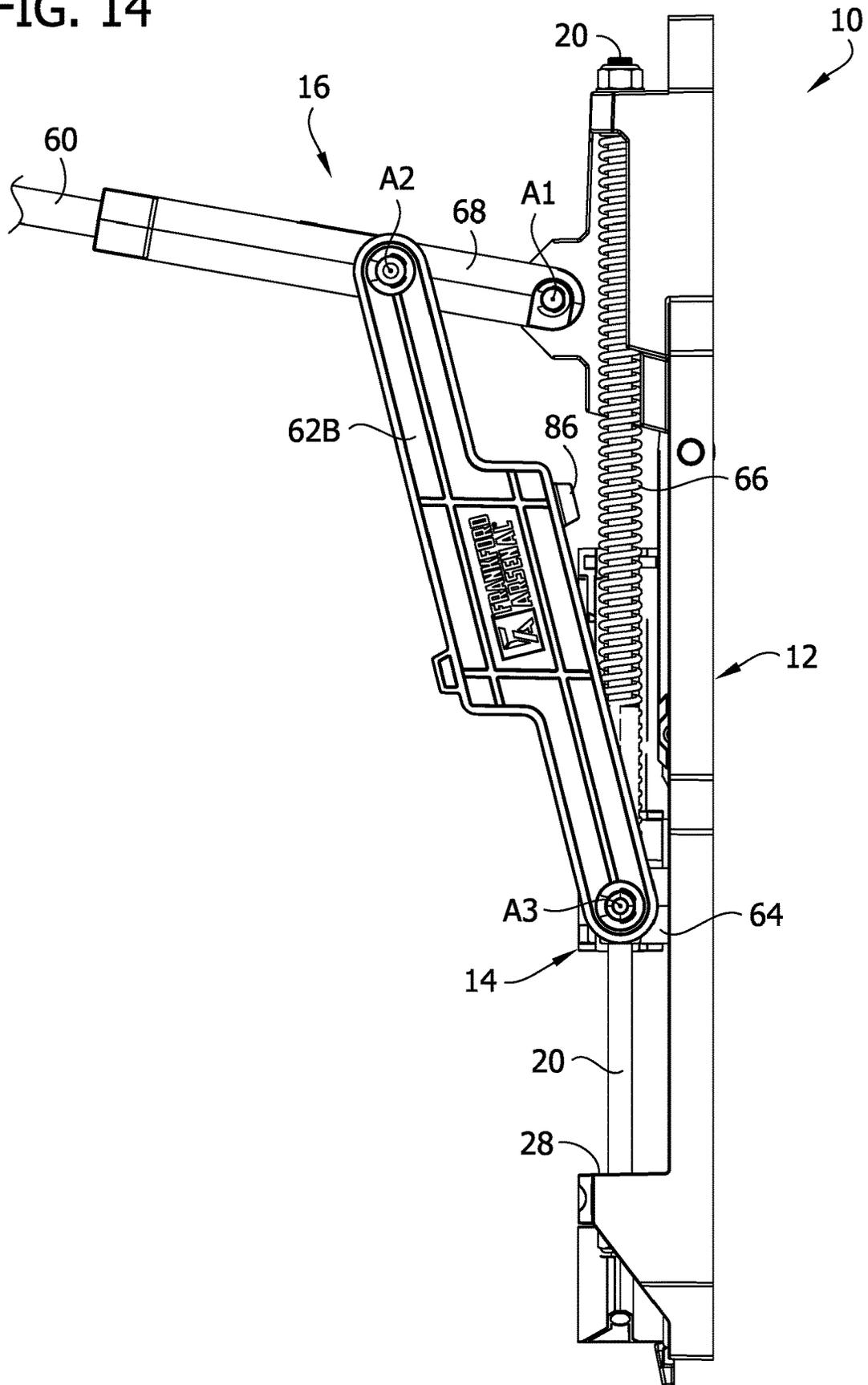


FIG. 15

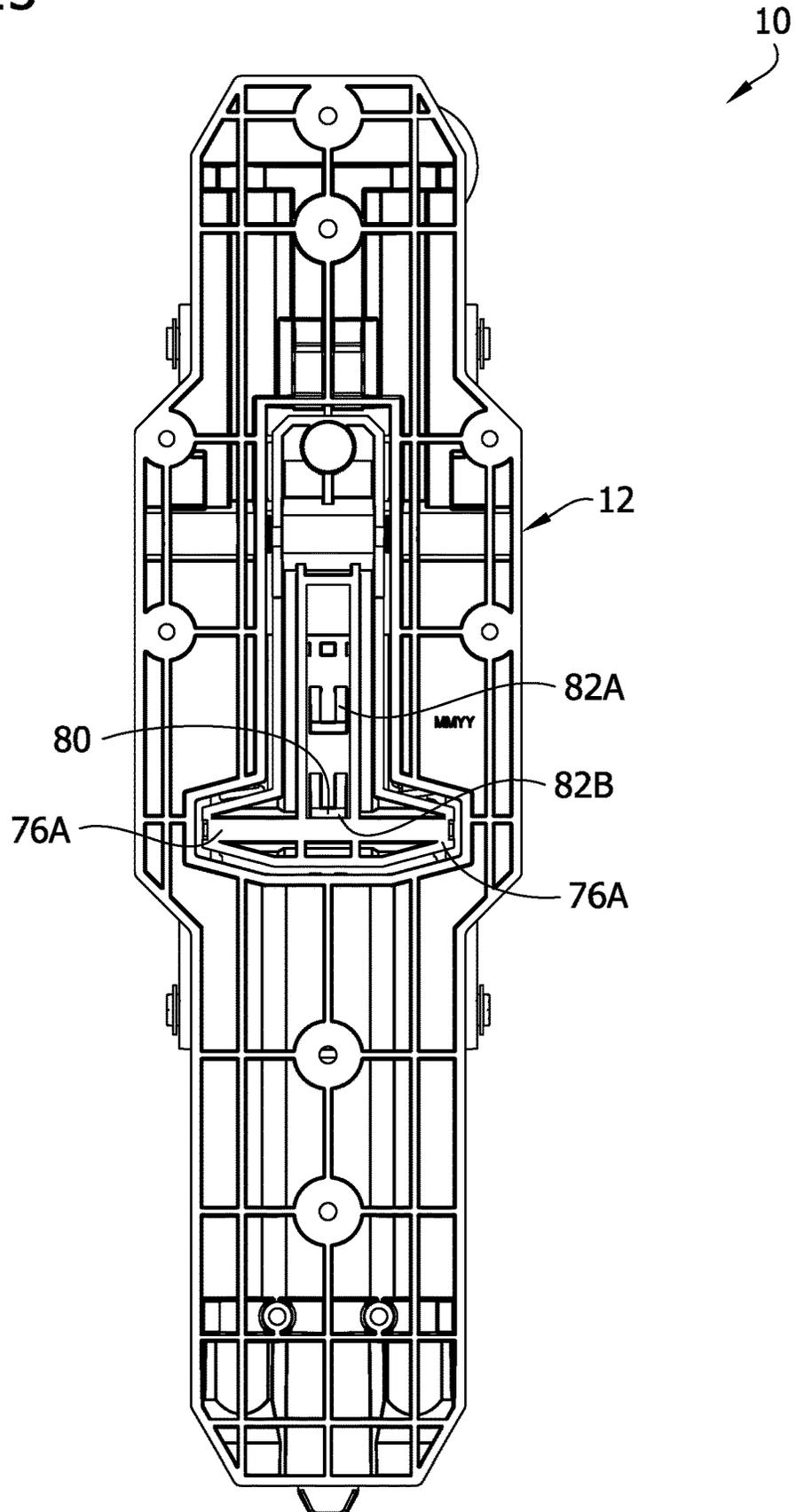


FIG. 16

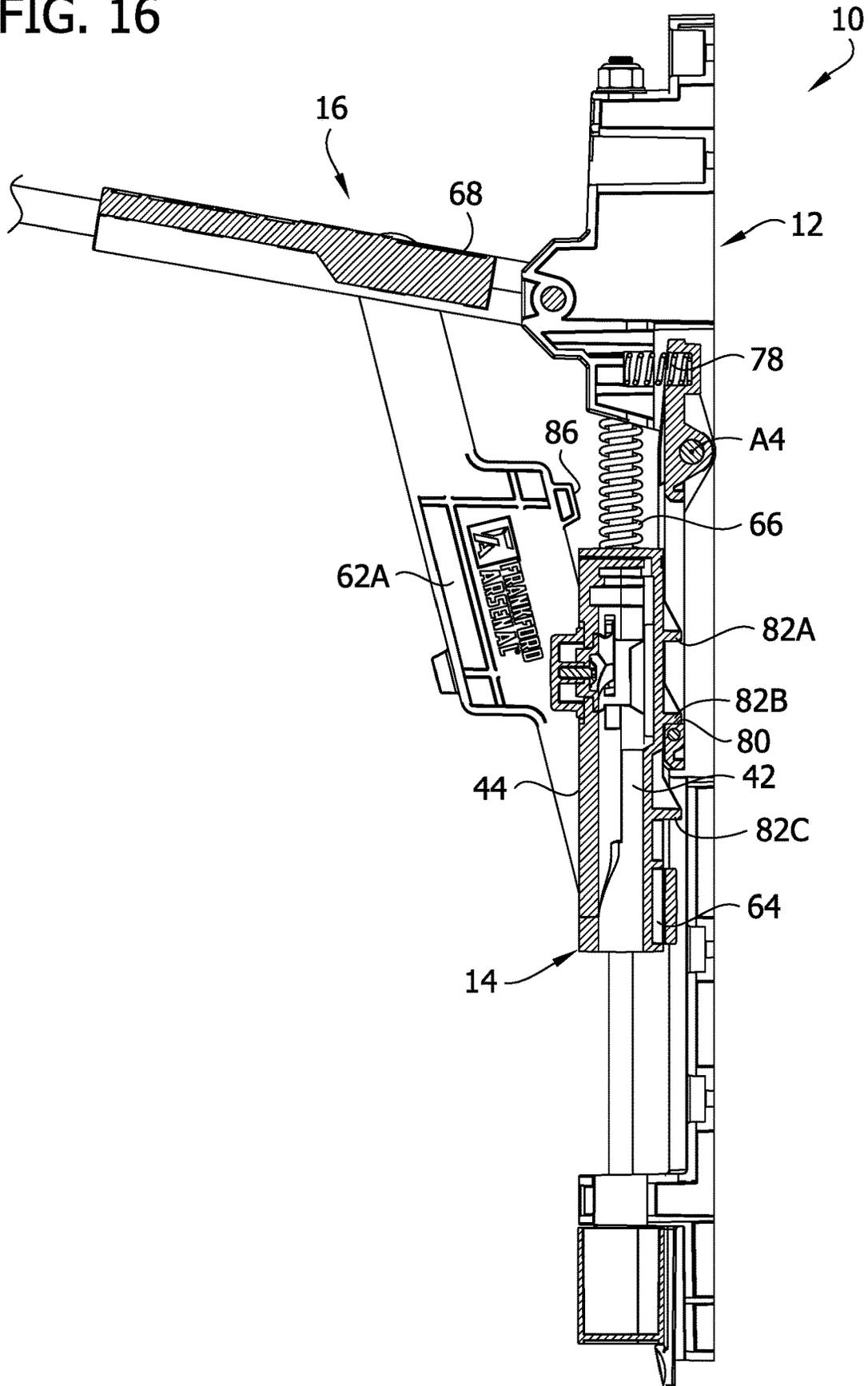


FIG. 17

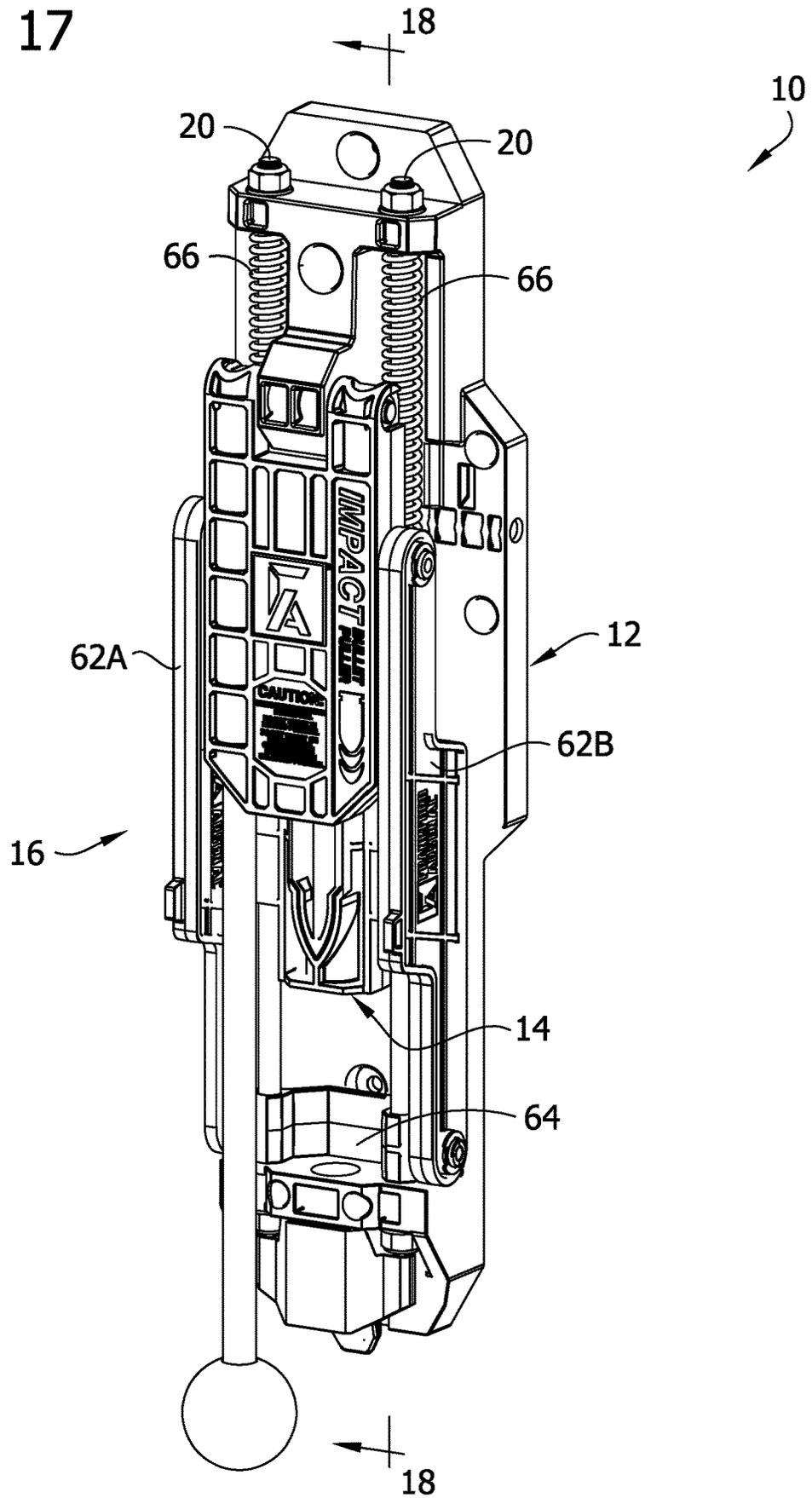


FIG. 18

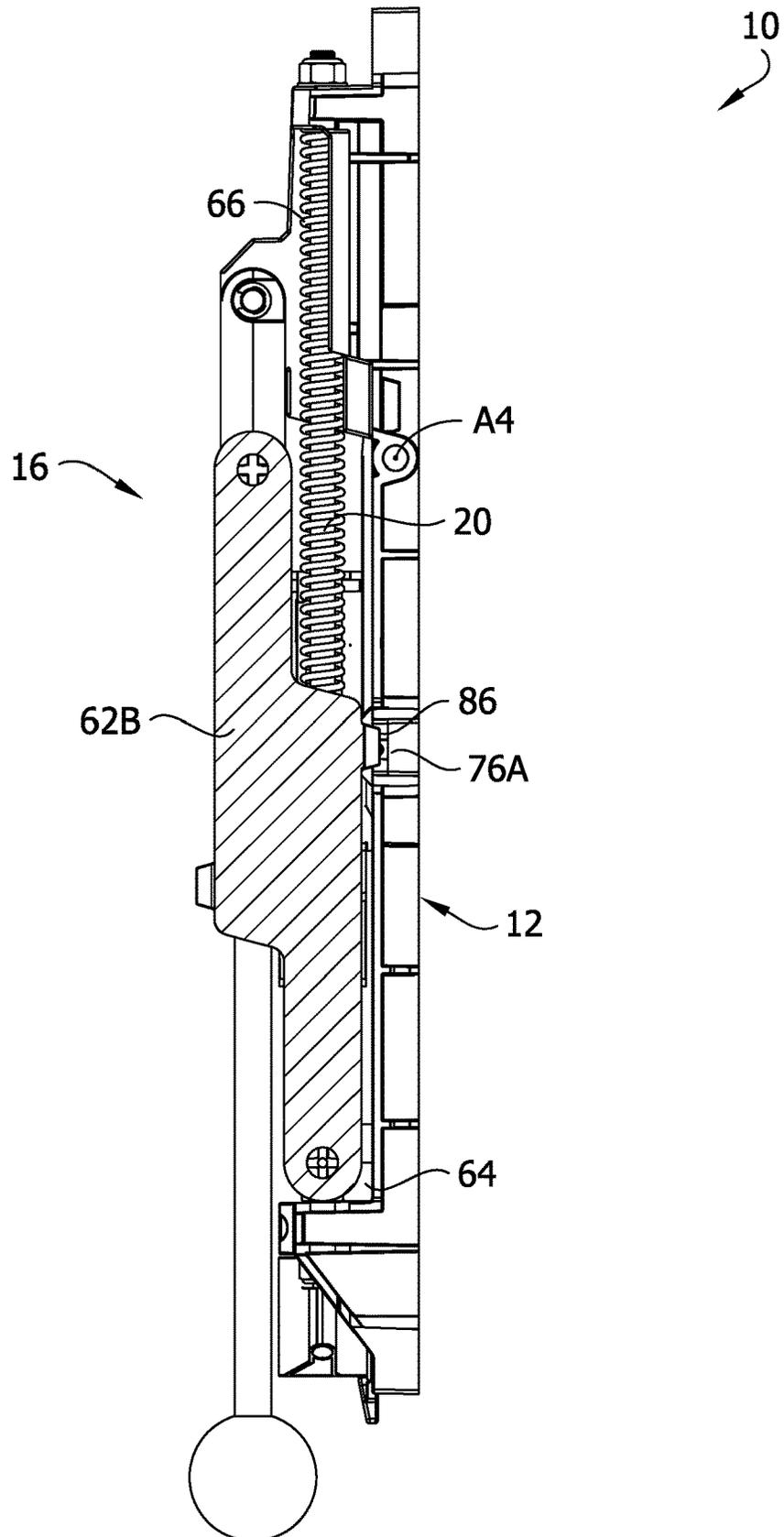


FIG. 19

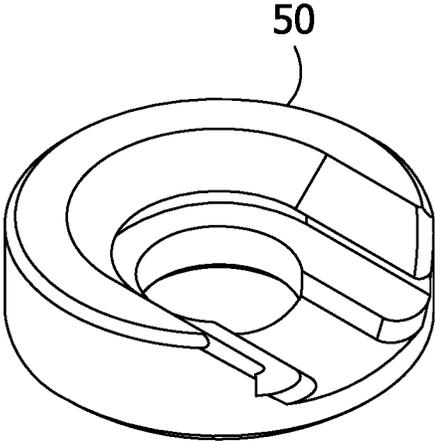


FIG. 20

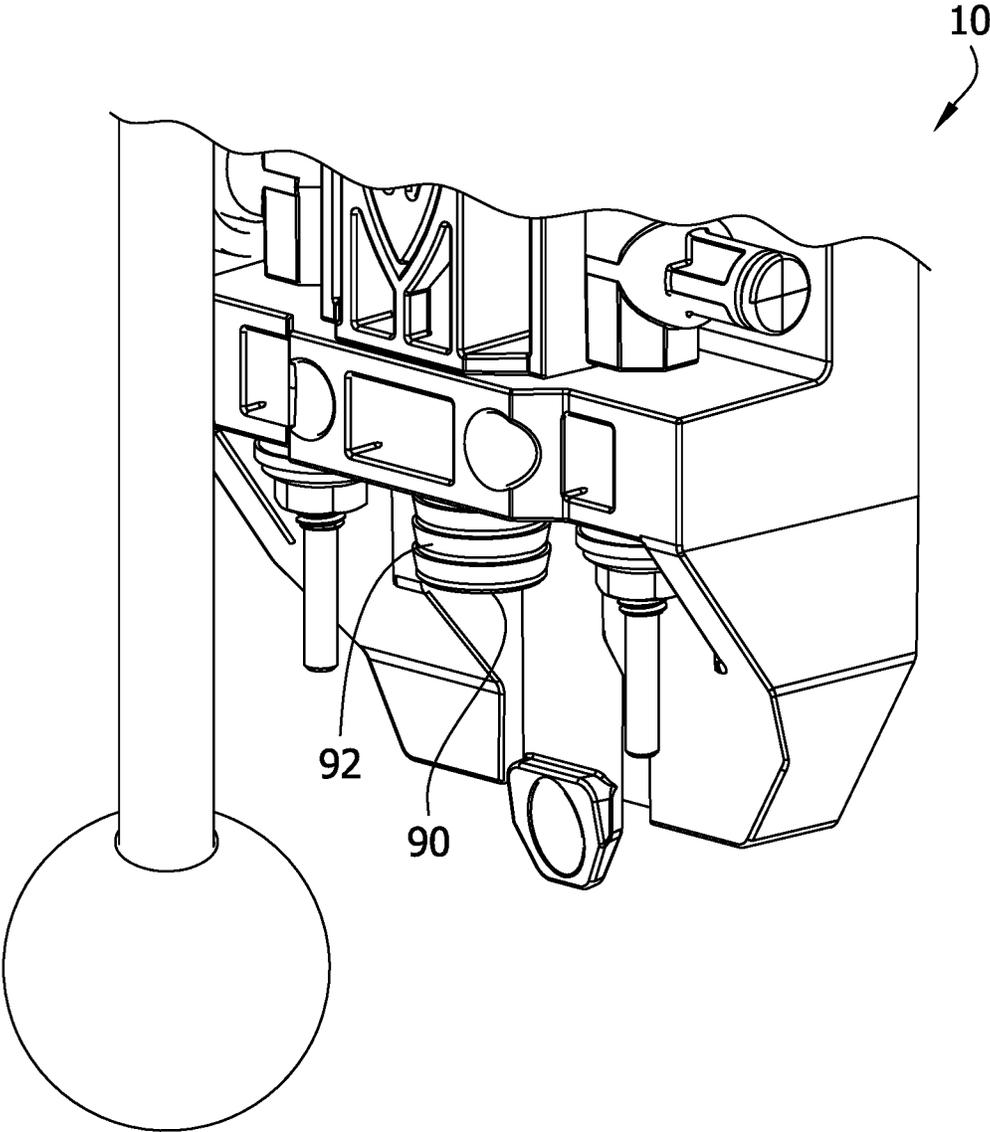


FIG. 21

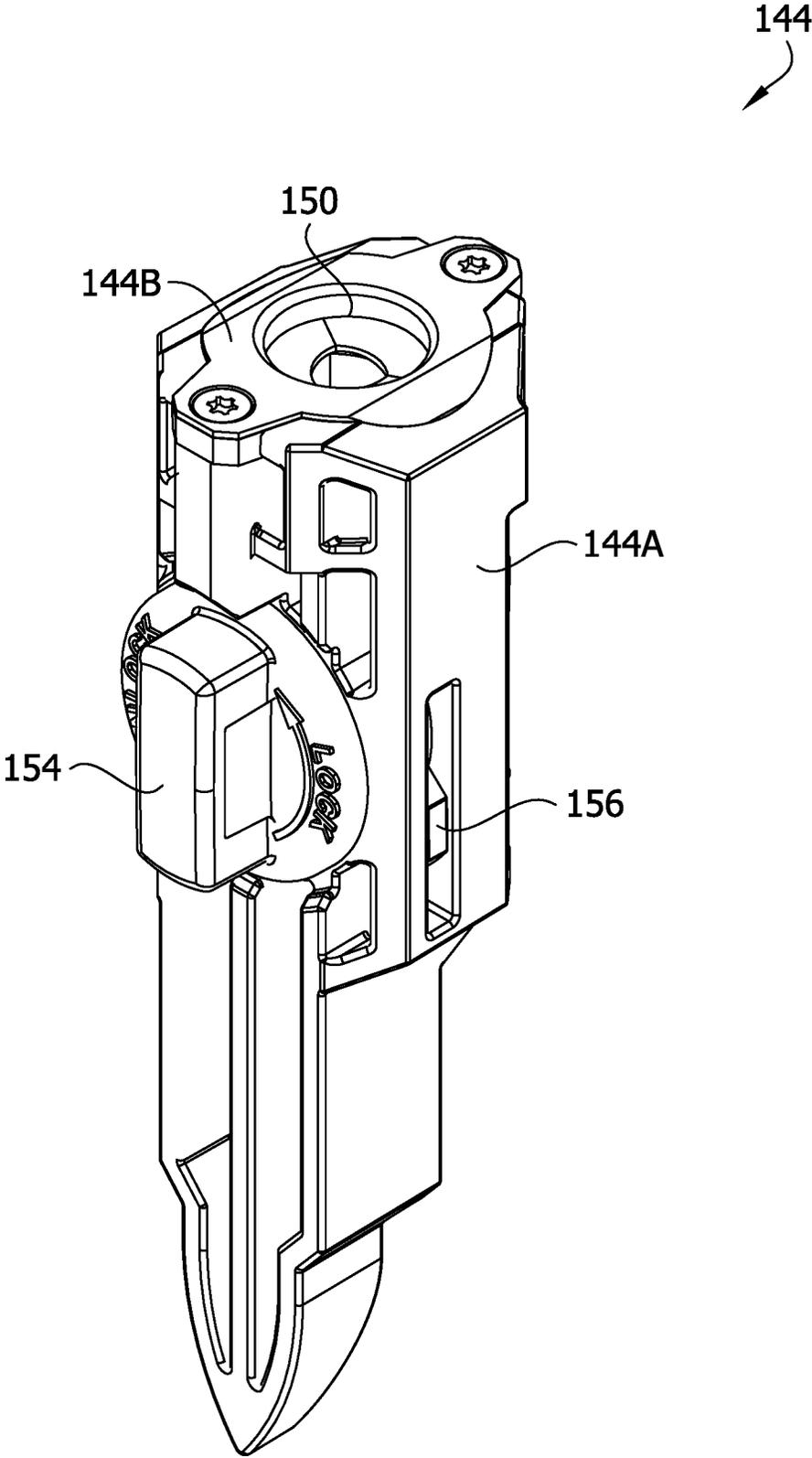


FIG. 22

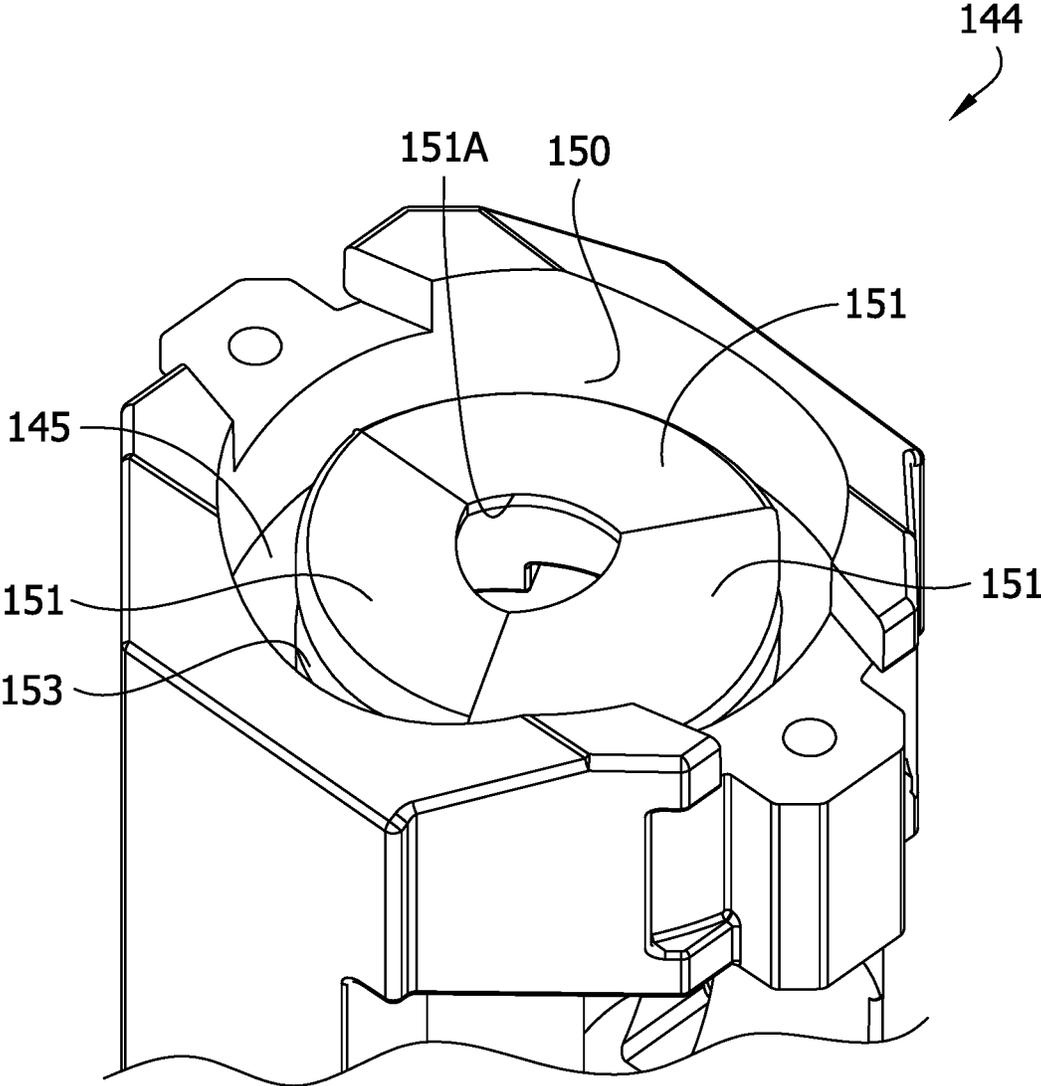


FIG. 23

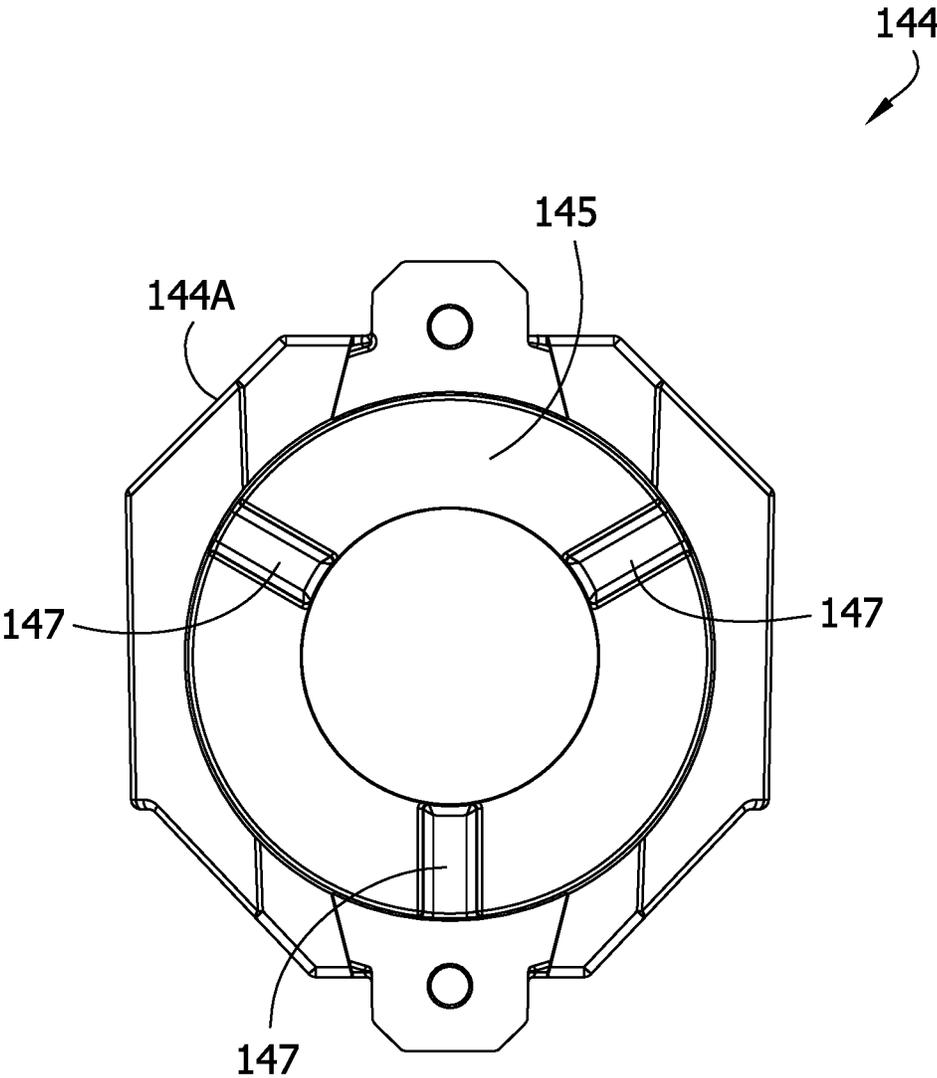
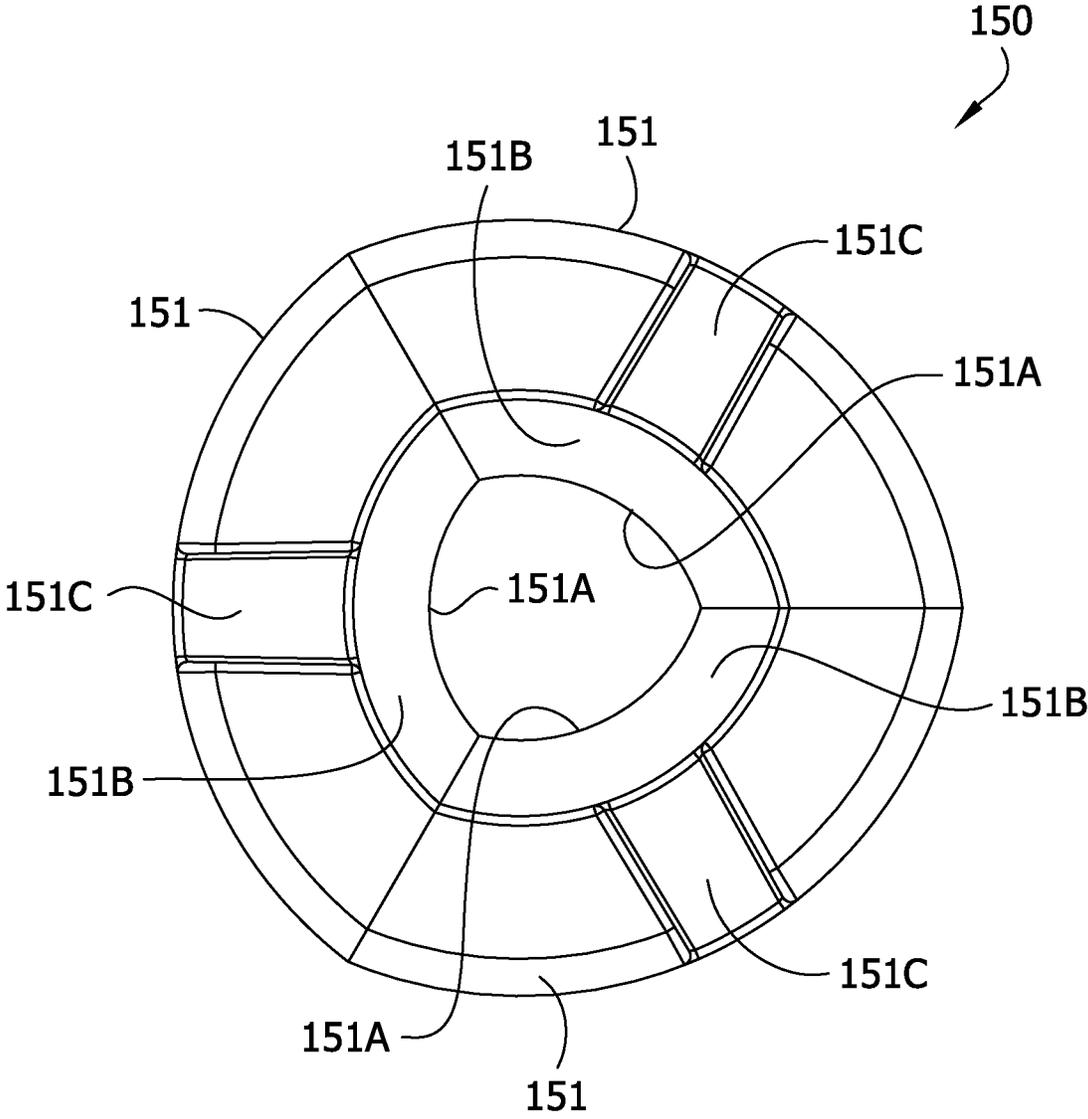


FIG. 24



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INERTIA BULLET REMOVERCROSS-REFERENCE TO RELATED
APPLICATION

The present application claims priority to U.S. Provisional Patent Application Ser. No. 62/941,431, filed Nov. 27, 2019, which is hereby incorporated by reference in its entirety.

FIELD

The present disclosure generally relates to ammunition equipment, and more particularly to an inertia bullet remover for removing a bullet from an ammunition casing.

BACKGROUND

For various reasons, a person may desire to remove a bullet from an ammunition casing. For example, the person may desire to break down or disassemble an ammunition cartridge if it was determined to have been loaded improperly (e.g., wrong load of powder, incorrect bullet, etc.).

SUMMARY

In one aspect, an inertia bullet remover is for removing a bullet from an ammunition casing. The inertia bullet remover comprises a frame and a carriage configured to carry the ammunition casing. The carriage is supported by the frame and movable with respect to the frame between a first position and a second position. The inertia bullet remover includes a guide supported by the frame and arranged to guide movement of the carriage between the first and second positions. A stop surface is arranged to stop movement of the carriage with respect to the frame in the second position. A carriage driver supported by the frame is arranged to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet via inertia to exit the ammunition casing carried by the carriage.

In another aspect, a method is for removing a bullet from an ammunition casing. The method comprises moving a carriage carrying the ammunition casing along a track from a first position to a second position; and stopping movement of the carriage in the second position to cause the bullet to exit the ammunition casing via inertia.

Other objects and features of the present disclosure will be in part apparent and in part pointed out herein.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective of an inertia bullet remover of the present disclosure;

FIG. 2 is a front elevation of the inertia bullet remover;

FIG. 3 is a right elevation of the inertia bullet remover;

FIG. 4 is a rear elevation of the inertia bullet remover;

FIG. 5 is a fragmentary front perspective of the inertia bullet remover;

FIG. 6 is a view similar to FIG. 5 but showing a container removed from a container holder;

FIG. 7 is a fragmentary front perspective of the inertia bullet remover having a cartridge carrier removed from a carriage housing;

FIG. 8 is a front elevation of a cartridge carrier;

FIG. 9 is a rear perspective of the cartridge carrier;

FIG. 10 is a rear elevation of the cartridge carrier;

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FIG. 11 is a section of the inertia bullet remover taken in a plane including line 11-11 of FIG. 2;

FIG. 12 is a front perspective of the inertia bullet remover having a lever moved to an actuated position for moving the carriage to a loaded position;

FIG. 13 is a front elevation of the inertia bullet remover in the configuration of FIG. 12;

FIG. 14 is a right elevation of the inertia bullet remover in the configuration of FIG. 12;

FIG. 15 is a rear elevation of the inertia bullet remover in the configuration of FIG. 12;

FIG. 16 is a fragmentary section of the inertia bullet remover taken in a plane including line 16-16 of FIG. 13;

FIG. 17 is a front perspective of the inertia bullet remover having the carriage in a loaded position and the lever returned to a home position;

FIG. 18 is a section of the inertia bullet remover taken in a plane including line 18-18 of FIG. 17;

FIG. 19 is a front perspective of an ammunition casing holder usable with the inertia bullet remover;

FIG. 20 is a fragmentary bottom perspective of the inertia bullet remover showing a barbed tube fitting for receiving a bullet and powder collection tube;

FIG. 21 is a front perspective of a second embodiment of a cartridge carrier of the present disclosure;

FIG. 22 is a fragmentary perspective of the cartridge carrier of FIG. 21 having a cover thereof removed to show an ammunition casing holder;

FIG. 23 is a top view of the cartridge carrier having the cover and ammunition casing holder removed; and

FIG. 24 is a bottom view of the ammunition casing holder.

Corresponding reference characters indicate corresponding parts throughout the drawings.

DETAILED DESCRIPTION

Referring to FIG. 1, an inertia bullet remover of the present disclosure is indicated generally by the reference number 10. As will become apparent, the remover 10 is configured to remove a bullet from a case or shell (broadly, "ammunition casing") of a firearm cartridge. The remover 10 removes the bullet by moving the cartridge rapidly and then suddenly stopping the cartridge while holding the case such that inertia causes the bullet and powder from inside the case to exit the mouth of the case.

The remover 10 includes a base 12, a carriage 14, and a carriage driver 16 for driving movement of the carriage with respect to the base. Using any one or more of fastener holes 18, the remover 10 can be mounted (e.g., in a vertical orientation) by fasteners to any suitable structure, such as a wall or a reloading bench. It will be appreciated that bullet removers may be configured to operate in any other orientation without departing from the scope of this disclosure.

The base 12 includes a frame 13 and a track (broadly, "guide") on which the carriage 14 is movable. In the illustrated embodiment, the track comprises two rods (broadly, "rails") 20 extending from an upper rod connecting portion 22 of the frame 13 to a lower rod connecting portion 24 of the frame. The rods pass through openings in the rod connecting portions 22, 24 and are secured in position by nuts on opposite ends of the rods. The nuts on opposite ends of a rod 20 are tightened to oppose the rod connecting portions 22, 24 of the frame 13 to tension the rod and apply compression to the frame between the rod connecting portions, for reasons which will become apparent. The base 12 includes a stop 28 defining a stop surface for stopping movement of the carriage 14. The base 12 also defines a

holder **30** (FIG. 6) for holding a bullet and powder container **32** (e.g., trap) arranged to catch a bullet and powder ejected from a case held by the carriage **14**.

In the illustrated embodiment, the container **32** includes two sleeves **32A** configured to fit over ends of the rods **20** to locate the container on the base. The base **12** includes a resiliently deflectable latch **34** configured to hold the container **32** in position. To install the container **32**, the container is moved onto the ends of the rods. The container **32** pushes the latch **34** rearward, and the latch temporarily deflects and then resumes its at rest position after the bottom of the container passes a tooth **34A** of the latch. The tooth **34A** supports the bottom of the container **32** to hold the container in position on the rods **20**. To remove the container **32**, a user presses the latch **34** rearward to permit the container to be moved off the rods **20**.

The carriage **14** is configured to hold an ammunition case or shell from which a user would like to remove a bullet. The carriage **14** includes followers **40** defining openings through which the rods **20** extend. The followers **40** permit and guide movement of the carriage **14** along the rods **20** for ejecting a bullet from a shell carried by the carriage.

The carriage **14** includes a carriage housing **42** on which a cartridge carrier **44** is mountable. The carriage housing **42** defines a cavity in which the carrier **44** is receivable. The carriage housing **42** includes a front opening that is closed by the carrier **44**. The carrier **44** includes a carrier housing **44A** defining a cartridge compartment **46** (FIG. 9) in which cartridges of different types and sizes are receivable. The carrier **44** includes a shell holder mount **48** configured to receive standard shell holders **50** (broadly, "ammunition casing holder") configured to hold different types of shells. The shell holders **50** are interchangeable on the mount **48** for adapting the remover **10** for use with different types of cartridges. As shown in FIG. 10, the shell holder **50** installed on the carrier **44** grips the shell by a flange of the shell at a primer end of the shell and holds the shell in position for conjoint movement with the carrier. A user can move a cartridge into the cartridge compartment **46** and slide the cartridge into the shell holder **50** laterally with respect to a longitudinal axis of the cartridge. In use, a cartridge is loaded in the cartridge compartment **46**, and then the carrier **44** is installed in the cavity of the carriage housing **42**. The carrier **44** acts as a door to close the front opening of the carriage housing **42**. The carrier **44** includes a retainer **54** configured to releasably retain the carrier in position on the carriage housing **42**. In the illustrated embodiment, the retainer **54** comprises an actuator (e.g., knob) and a pair of latches **56** movable into and out of slots **58** (broadly, "keepers") (FIG. 7) in the sides of the carriage housing **42** (e.g., by rotating the knob about 45 degrees in opposite first and second directions) to lock and unlock the carrier on the carriage housing.

The carriage driver **16** is configured to move the carriage **14** from a starting position (broadly, "second position") (e.g., FIGS. 1, 2, 11) to a loaded position (broadly, "first position") (e.g., FIGS. 12, 13, 14, 16). After the carriage **14** is moved to the loaded position, the carriage is released to move back to the starting position. The movement of the carriage **14** toward the starting position happens rapidly, and the carriage is stopped suddenly in the starting position, such that inertia causes the bullet and powder to leave the shell and be captured by the container **32**.

The cartridge driver **16** includes an actuator **60**, a linkage **62**, a carriage pusher **64**, and a set of compression springs **66** (broadly, "biasing elements") received on the rods **20**. In the illustrated embodiment, the actuator **60** comprises a lever.

The lever **60** has a distal end including a knob and a proximal end connected to a lever mount **68**. The lever mount **68** is pivotally connected to the base **12** to pivot about a pivot axis **A1**. The linkage **62** includes first and second links **62A**, **62B** on opposite sides of the base **12**. The lever mount **68** is pivotally connected to upper (first) portions of the links **62A**, **62B** to pivot with respect to the links about a pivot axis **A2**. Lower (second) portions of the links **62A**, **62B** are pivotally connected to the carriage pusher **64** to pivot about a pivot axis **A3**. In the illustrated embodiment, the carriage pusher **64** includes two collars slidable on the rods **20** to guide movement of the carriage pusher along the rods. The arrangement is such that as the lever **60** is pivoted away from the base **12** (e.g., from a home position to an actuated position), the lever and lever mount **68** pivot about the pivot axis **A1**, which causes the linkage **62** to pull the carriage pusher **64** upward, to move the carriage **14** toward a loaded position of the carriage. Before the carriage pusher **64** contacts the carriage **14**, the carriage pusher moves across a small clearance space **70** (e.g., 2 mm) (FIGS. 2, 5), for reasons which will become apparent. As the carriage **14** moves upward, the followers **40** of the carriage press against the springs **66** on the rods **20** and compress the springs.

The remover **10** also includes a carriage retainer **74** for retaining the carriage **14** in a loaded position prior to releasing the carriage to eject the bullet from the shell. In the illustrated embodiment, the carriage retainer **74** comprises a ratchet mechanism configured to retain the carriage in progressive loaded positions at different compression states of the springs. The ratchet mechanism comprises a lever **76** pivotable about a pivot axis **A4** (FIGS. 11 and 16) and biased by a spring **78**. The lever **76** has a catch **80** arranged to engage a set of teeth (broadly, "keepers") **82A-82C** (three teeth in the illustrated embodiment) on a rear side of the carriage **14**. The catch **80** rides on the rear of the carriage **14** and over the teeth **82A-82C** as the carriage is moved upward. Each tooth **82A-82C** includes a ramped surface configured to deflect the catch away from the carriage to permit the tooth to pass the catch. After a tooth **82A-82C** passes the catch **80**, the catch is moved by the spring **78** into retaining position with respect to a retaining surface of the tooth. If the user were to release the lever **60**, the catch **80** would prevent the carriage **14** from moving back to its starting position by engaging the retaining surface of the tooth **82A-82C** above the catch. It will be appreciated that different types of carriage retainers (e.g., different types of ratchet mechanisms) can be used without departing from the scope of the present disclosure. For example, a single tooth instead of multiple teeth could be used such that there is a single retained loaded position rather than progressive retained loaded positions.

The user can select the amount of compression applied to the springs **66** by the amount the lever **60** is pivoted away from its home position, and thus select the force at which the carriage **14** will be moved back to the starting position. FIGS. 12-16 show the lever **60** pivoted to drive the carriage **14** to an intermediate loaded position in which the second tooth **82B** is above the catch **80**. If the user desired to drive the carriage **14** to a fully loaded position (maximum spring compression), the lever would be pivoted farther upward than shown in FIGS. 12-16 to drive the lowest (third) tooth **82C** above the catch **80**. In other embodiments, the force at which the carriage **14** will be moved back to the starting position could be adjusted or selected in other ways (e.g., changing or adjusting a spring retainer). In still other embodiments (e.g., not having progressive retained loaded

positions), the force at which the carriage **14** will be moved back to the starting position may not be adjustable.

When the user desires to release the carriage **14** to cause the bullet and powder to eject from the shell, the user pivots the lever **60** back to its home position. As the lever **60** approaches the home position, the linkage **62** moves the carriage pusher **64** back across the clearance space **70** to be out of the carriage travel path. After the carriage pusher **64** is moved out of the carriage travel path, releases **86** in the form of protrusions on both links **62A**, **62B** of the linkage **62** press on wings **76A** of the spring-biased lever **76** to move the catch **80** rearward to disengage the catch from the carriage **14**. The teeth **82A-82C** are therefore no longer blocked by the catch **80**, and the springs **66** are permitted to forcefully propel the carriage **14** toward its starting position. The carriage **14** moves rapidly toward the starting position and impacts the stop **28** of the base **12** to stop the carriage in the starting position. The rods **20**, in tension and applying compression to the base **12**, assist in reinforcing the base and absorb force from the impact of the carriage **14** against the stop **28**. The inertia of the bullet and powder causes the bullet and powder to be ejected from the shell, which is held in position on the carriage **14** by the shell holder **50**. The bullet and powder move through a lower opening in the carriage, through an opening in the base, and pass into the container **32** for collecting the bullet and powder in the container. The cartridge carrier **44** closing the front opening of the carriage housing **42** prevents powder from escaping the carriage **14** except through the lower opening to the container **32**. The bullet and powder can be removed from the container **32** by removing the container from the base **12** and dumping the container. The carrier **44** is removed from the carriage housing **42**, the empty shell is removed from the carrier **44**, and another cartridge is installed in the carrier. The process can be repeated to remove bullets and powder from additional cartridges.

It will be appreciated that the container **32** can be replaced by any other receptacle or series of receptacles, such as a tube or bucket, and the replacement receptacle(s) may or may not be physically attached to the remover **10**, without departing from the scope of this disclosure. For example, as shown in FIG. **20**, a fitting **90** is provided for connection of a tube to receive powder and bullets removed from ammunition casings by the remover **10**. The fitting comprises a tubular portion sized and shaped to fit inside an end of a tube. The fitting **90** can include barbs, ribs, or other retainers **92** to engage the tube to assist in holding the tube on the fitting. It will be appreciated that a tube connected to the fitting **90** can have an outlet end located to deliver powder and bullets into a bucket or other receptacle.

It will be appreciated that the remover **10** provides spring propulsion of the carriage and a mechanical advantage in compressing the springs **66**. Accordingly, users can easily generate an amount of force needed to eject a bullet from a shell. Moreover, standard shell holders can be used for holding the cartridges. The remover **10** is universal in that the remover can remove a bullet from essentially any type of ammunition cartridge with the use of an appropriate shell holder.

A second embodiment of a cartridge carrier **144** will be described with reference to FIGS. **21-24**. The cartridge carrier **144** of this embodiment is very similar to the cartridge carrier **44** described above, and like reference numbers, plus 100, are used to designate like elements. For example, the cartridge carrier **144** is configured to be selectively installed on and carried by the cartridge carriage **14**. The cartridge carrier **144** includes a housing **144A** and a

retainer **154** including a rotatable knob to move latches **156** to releasably retain the carrier on the carriage **14**.

The primary difference between the first and second embodiments of the carriers **44**, **144** is the manner in which the ammunition cartridge is supported by the cartridge carrier. In the second embodiment, instead of using standard shell holders (e.g., **50** in FIGS. **10**, **19**), the cartridge carrier **144** includes a collet **150** configured to receive and retain ammunition casings of various sizes. The collet **150** automatically adjusts to hold the casings of various sizes. The collet **150** rests on a bed **145** defined by an upper end of the housing **144A** of the cartridge carrier **144**. A removable cover **144B** holds the collet **150** in position on the bed **145**. The collet **150** includes multiple jaws **151** movable with respect to each other to adjust the size of an ammunition casing receiving space therebetween. Each jaw **151** includes an arcuate lip **151A** bounding the ammunition casing receiving space and located to be received in a groove of an ammunition casing and/or against a flange of the ammunition casing to locate the ammunition casing with respect to the cartridge carrier **144**. An elastic band **153** (broadly, "biasing member") surrounds the jaws **151** and biases the jaws inwardly. The elastic band **153** permits outward movement against the bias of the band. The jaws **151** include grooves **151C** that ride on ribs **147** of the housing **144A** to guide inward/outward movement of the jaws and maintain the collet **150** in a centered location.

The arrangement is such that an ammunition cartridge can be installed on the cartridge carrier **144** by pushing the bullet end of the cartridge downward into the top of the cartridge receiving space. The tapered shape of the bullet causes the jaws **151** to move away from each other. The jaws **151** deflect outward and ride on the ammunition casing until the groove of the ammunition casing is moved into registration with the lips **151A** of the jaws. The jaws **151** move into the groove and thus retain the ammunition casing in position with respect to the cartridge carrier **144**. After the bullet is removed from the ammunition casing, the casing can be removed from the collet **150** by pushing the casing upward opposite the insertion direction. The jaws **151** include tapered lower surfaces **151B** that cam on the ammunition casing to assist in spreading the jaws to permit removal of the casing. It will be appreciated that other types of collets (broadly, "ammunition casing holders") can be used without departing from the scope of the present disclosure.

It will be apparent that modifications and variations are possible without departing from the scope of the invention defined in the appended claims.

As various changes could be made in the above constructions and methods without departing from the scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. An inertia bullet remover for removing a bullet from an ammunition casing, the inertia bullet remover comprising:
 - a frame;
 - a carriage configured to carry the ammunition casing, the carriage being supported by the frame and being movable with respect to the frame between a first position and a second position;
 - a guide supported by the frame and arranged to guide movement of the carriage between the first and second positions;
 - a stop surface supported by the frame and arranged to stop movement of the carriage with respect to the frame in the second position;

a carriage driver supported by the frame, the carriage driver including a lever movable in an actuating direction to drive movement of the carriage away from the second position toward the first position, and the carriage driver being arranged to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet via inertia to exit the ammunition casing carried by the carriage.

2. An inertia bullet remover as set forth in claim 1, wherein the carriage driver comprises at least one biasing member positioned to bias the carriage toward the second position to move the carriage toward the second position.

3. An inertia bullet remover as set forth in claim 2, further comprising a carriage retainer arranged to retain the carriage in the first position against the bias of the biasing member.

4. An inertia bullet remover as set forth in claim 3, further comprising a release arranged to release the carriage retainer to permit the biasing member to move the carriage toward the second position.

5. An inertia bullet remover as set forth in claim 4, wherein the biasing member comprises a spring.

6. An inertia bullet remover as set forth in claim 1, wherein the guide comprises a track and the carriage includes at least one follower movable along the track to guide movement of the carriage between the first and second positions.

7. An inertia bullet remover as set forth in claim 6, wherein the track includes a rail along which the at least one follower is movable.

8. An inertia bullet remover as set forth in claim 7, wherein the rail is in tension and applies compression to the frame.

9. An inertia bullet remover as set forth in claim 1, further comprising a carrier for holding the ammunition casing, the carrier being configured to be carried by the carriage between the first and second positions.

10. An inertia bullet remover as set forth in claim 9, wherein at least one of the carrier and the carriage includes a retainer arranged to releasably retain the carrier on the carriage.

11. An inertia bullet remover as set forth in claim 10, wherein the retainer comprises an actuator selectively movable between retaining and non-retaining positions, the actuator when in the retaining position causing the carrier to be releasably retained on the carrier.

12. An inertia bullet remover as set forth in claim 11, wherein the retainer comprises a latch, and the other of the at least one of the carrier and the carriage comprises a keeper arranged to contact the latch in a retaining position of the latch to releasably retain the carrier on the carriage.

13. An inertia bullet remover as set forth in claim 1, wherein the stop surface is arranged to contact the carriage to stop movement of the carriage in the second position.

14. An inertia bullet remover as set forth in claim 1, wherein the carriage driver comprises at least one compression spring arranged to compress responsive to the lever driving movement of the carriage away from the second position toward the first position, the at least one compression spring configured to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet via inertia to exit the ammunition casing carried by the cartridge.

15. An inertia bullet remover as set forth in claim 14, wherein the carriage driver comprises a carriage pusher operatively connected to the lever, the carriage pusher being

movable with respect to the lever and responsive to movement of the lever in the actuating direction to push the carriage toward the first position away from the second position.

16. An inertia bullet remover as set forth in claim 15, further comprising a linkage operatively connecting the lever to the carriage pusher, the linkage being movable with respect to the lever and the carriage pusher.

17. An inertia bullet remover as set forth in claim 15, further comprising a carriage retainer arranged to retain the carriage in the first position responsive to the carriage arriving to the first position.

18. An inertia bullet remover as set forth in claim 15, wherein the lever is movable in a return direction opposite the actuating direction, and further comprising a carriage retainer arranged to retain the carriage in the first position as the lever is moved in the return direction.

19. An inertia bullet remover as set forth in claim 18, wherein the lever is configured to cause release of the retainer to permit the carriage to move from the first position toward the second position.

20. An inertia bullet remover for removing a bullet from an ammunition casing, the inertia bullet remover comprising:

a frame;

a carriage configured to carry the ammunition casing, the carriage being supported by the frame and being movable with respect to the frame between a first position and a second position;

a guide supported by the frame and arranged to guide movement of the carriage between the first and second positions;

a stop surface supported by the frame and arranged to stop movement of the carriage with respect to the frame in the second position;

a carriage driver supported by the frame and arranged to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet via inertia to exit the ammunition casing carried by the carriage; wherein the carriage driver comprises an actuator and a linkage, the linkage being movable with respect to the frame and with respect to the actuator to convert movement of the actuator to movement of the carriage toward the first position.

21. An inertia bullet remover as set forth in claim 20, wherein the actuator comprises a lever pivotally connected to the frame.

22. An inertia bullet remover as set forth in claim 20, wherein the carriage driver includes a carriage pusher arranged to push the carriage toward the first position responsive to movement of the actuator.

23. An inertia bullet remover as set forth in claim 20, further comprising a carriage retainer configured to selectively retain the carriage in the first position.

24. An inertia bullet remover as set forth in claim 23, wherein the carriage retainer is configured to automatically retain the carriage in the first position responsive to the carriage moving toward the first position.

25. An inertia bullet remover for removing a bullet from an ammunition casing, the inertia bullet remover comprising:

a frame;

a carriage configured to carry the ammunition casing, the carriage being supported by the frame and being movable with respect to the frame between a first position and a second position;

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a guide supported by the frame and arranged to guide movement of the carriage between the first and second positions;

a stop surface supported by the frame and arranged to stop movement of the carriage with respect to the frame in the second position;

a carriage driver supported by the frame and arranged to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet via inertia to exit the ammunition casing carried by the carriage;

a carrier for holding the ammunition casing, the carrier being configured to be carried by the carriage between the first and second positions;

wherein the carrier includes an adjustable ammunition casing holder configured to hold ammunition casings having different sizes.

26. An inertia bullet remover as set forth in claim **25**, wherein the ammunition casing holder comprises multiple jaws, at least one of the jaws being movable to adjust a space between the jaws to hold ammunition casings of different sizes therebetween.

27. A method of removing a bullet from an ammunition casing, the method comprising:

- moving an actuator with respect to a track and with respect to a carriage carrying the ammunition casing to cause the carriage to move along the track toward a first position away from a second position;
- moving the carriage carrying the ammunition casing along the track from the first position to the second position; and
- stopping movement of the carriage in the second position to cause the bullet to exit the ammunition casing via inertia.

28. An inertia bullet remover for removing a bullet from an ammunition casing, the inertia bullet remover comprising:

- a frame;
- a carriage configured to carry the ammunition casing, the carriage being supported by the frame and being movable with respect to the frame between a first position and a second position;
- a guide supported by the frame and arranged to guide movement of the carriage between the first and second positions;
- a stop surface supported by the frame and arranged to stop movement of the carriage with respect to the frame in the second position;
- a carriage driver supported by the frame and arranged to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet via inertia to exit the ammunition casing carried by the cartridge.

29. An inertia bullet remover as set forth in claim **28**, further comprising a carriage retainer arranged to retain the carriage in the first position responsive to the carriage arriving to the first position.

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30. An inertia bullet remover as set forth in claim **28**, wherein the carriage driver comprises an actuator movable in an actuating direction to drive movement of the carriage toward the first position away from the second position, and the actuator is movable in a return direction opposite the actuating direction, and further comprising a carriage retainer arranged to retain the carriage in the first position as the actuator is moved in the return direction.

31. An inertia bullet remover for removing a bullet from an ammunition casing, the inertia bullet remover comprising:

- a frame;
- a carriage configured to carry the ammunition casing, the carriage being supported by the frame and being movable with respect to the frame between a first position and a second position;
- a guide supported by the frame and arranged to guide movement of the carriage between the first and second positions, the guide including opposite first and second end portions, the carriage being movable toward the first position by movement along the guide toward the first end portion, the carriage being movable toward the second position by movement along the guide toward the second end portion, the first end portion of the guide being connected to the frame to oppose movement of the first end portion in the direction of the second end portion, the second end portion of the guide being connected to the frame to oppose movement of the second end portion in the direction of the first end portion;
- a stop surface supported by the frame and arranged to stop movement of the carriage with respect to the frame in the second position;
- a carriage driver supported by the frame and arranged to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet via inertia to exit the ammunition casing carried by the carriage.

32. An inertia bullet remover as set forth in claim **31**, wherein the guide includes a rail, the rail being in tension and applying compression to the frame.

33. An inertia bullet remover for removing a bullet from an ammunition casing, the inertia bullet remover comprising:

- a frame;
- a carriage configured to carry the ammunition casing, the carriage being supported by the frame and being movable with respect to the frame between a first position and a second position;
- a guide supported by the frame and arranged to guide movement of the carriage between the first and second positions;
- a stop surface supported by the frame and arranged to stop movement of the carriage with respect to the frame in the second position;
- a carriage driver supported by the frame, the carriage driver including an actuator and a carriage pusher movable with respect to the actuator, the actuator being movable in an actuating direction to drive movement of the carriage pusher to push the carriage away from the second position toward the first position, and the carriage driver being arranged to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet via inertia to exit the ammunition casing carried by the carriage.

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34. An inertia bullet remover as set forth in claim 33, further comprising a carriage retainer arranged to retain the carriage in the first position responsive to the carriage arriving to the first position.

35. An inertia bullet remover as set forth in claim 33, wherein the actuator is movable in a return direction opposite the actuating direction, and further comprising a carriage retainer arranged to retain the carriage in the first position as the actuator is moved in the return direction.

36. An inertia bullet remover for removing a bullet from an ammunition casing, the inertia bullet remover comprising:

- a frame;
- a carriage configured to carry the ammunition casing, the carriage being supported by the frame and being movable with respect to the frame between a first position and a second position;
- a guide supported by the frame and arranged to guide movement of the carriage between the first and second positions;
- a stop surface supported by the frame and arranged to stop movement of the carriage with respect to the frame in the second position;
- a carriage driver supported by the frame, the carriage driver including an actuator movable in an actuating direction to drive movement of the carriage away from the second position toward the first position, the actuator being movable in a return direction opposite the actuating direction, and the carriage driver being arranged to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet via inertia to exit the ammunition casing carried by the carriage;
- a carriage retainer arranged to retain the carriage in the first position as the actuator is moved in the return direction.

37. An inertia bullet remover as set forth in claim 36, wherein the actuator is configured to cause release of the retainer to permit the carriage to move from the first position toward the second position.

38. An inertia bullet remover for removing a bullet from an ammunition casing, the inertia bullet remover comprising:

- a frame;
- a carriage configured to carry the ammunition casing, the carriage being supported by the frame and being movable with respect to the frame between a first position and a second position;
- an ammunition casing carrier configured to hold the ammunition casing, the ammunition casing carrier including an ammunition casing holder, the ammunition casing carrier being removable from the carriage to permit installation of the ammunition casing in the ammunition casing holder, the ammunition casing carrier being configured to be installed on the carriage while the ammunition casing holder holds the ammunition casing;
- a guide supported by the frame and arranged to guide movement of the carriage between the first and second positions;

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a stop surface supported by the frame and arranged to stop movement of the carriage with respect to the frame in the second position;

a carriage driver supported by the frame and arranged to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet via inertia to exit the ammunition casing carried by the carriage.

39. An inertia bullet remover as set forth in claim 38, wherein the carriage comprises a keeper and the ammunition casing carrier comprises a retainer selectively engageable with the keeper to retain the ammunition casing carrier on the carriage.

40. An inertia bullet remover for removing a bullet from an ammunition casing, the inertia bullet remover comprising:

- a frame;
- a carriage configured to carry the ammunition casing, the carriage being supported by the frame and being movable with respect to the frame between a first position and a second position;
- a guide supported by the frame and arranged to guide movement of the carriage between the first and second positions;
- a stop surface supported by the frame and arranged to stop movement of the carriage with respect to the frame in the second position;
- a carriage driver supported by the frame and arranged to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet via inertia to exit the ammunition casing carried by the carriage;
- a tube fitting supported by the frame, the tube fitting arranged to receive the bullet exited from the ammunition casing, the tube fitting configured to connect to a tube for transport of the bullet away from the tube fitting.

41. An inertia bullet remover for removing a bullet and ammunition powder from an ammunition casing, the inertia bullet remover comprising:

- a frame;
- a carriage configured to carry the ammunition casing, the carriage being supported by the frame and being movable with respect to the frame between a first position and a second position, the carriage including a first follower and a second follower;
- a guide supported by the frame and arranged to guide movement of the carriage between the first and second positions, the guide comprising a track including a first rail and a second rail, the first follower of the carriage being moveable along the first rail, and the second follower of the carriage being moveable along the second rail;
- a stop surface supported by the frame and arranged to stop movement of the carriage with respect to the frame in the second position;
- a carriage driver supported by the frame and arranged to force the carriage away from the first position toward the second position to cause the stop surface to stop movement of the carriage to cause the bullet and ammunition powder via inertia to exit the ammunition casing carried by the carriage.